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ARCHÆOLOGICAL INVESTIGATIONS IN KAMCHATKA

BY

WALDEMAR JOCHELSON

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WALDEMAR JOCHELSON

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CONTENTS

PAGE

Preface VII

Chapter I.

History 1
The Bering expeditions 2
Bering's first expedition 4
Bering's second expedition 4
Spanberg's voyage 7

Chapter II.

Japanese shipwrecks near Kamchatka shore 9
The uprising of the Kamchadal 10
The causes of revolts 10
Some mental traits of the old Kamchadal 11
The yassak or fur tribute 12

Chapter III.

The country and somatology of the Kamchadal 15
Geological past of Kamchatka 15
Geography and administrative divisions 16
Climate of Kamchatka 18
Somatology 19
Sanitary conditions among the Kamchadal 20

Chapter IV.

The stone age in Siberia and adjacent countries 23
The Siberian palæolith 23
Palæolithic remains in Inner Mongolia 25
The Siberian neolith 25
Some characteristics of the Siberian neolith 28
Stone industry 29
Ceramics 30
Bone industry 31
Dwellings of the neolithic period in Siberia 31
Skeletal remains of neolithic man in Siberia 31
Neolithic sites in countries adjacent to Siberia 32
The Lake Kosogol 32
The Inner Mongolia 33
The Gobi Desert 33
Eastern Mongolia, Manchuria, Korea, Japan and China 34
A warmer climate in Siberia during the neolithic period 35

Chapter V.

Metals in the prehistoric Kamchatka 37
Metals in Siberia 37
Transition from the neolithic period to the age of metals in Siberia 38
Direct transition of the neolithic culture in the iron age in some parts of Siberia 39

148979

Chapter VI.

PAGE

Archæological remains from the Kamchatka Excavations 41
Source material for stone implements 41
Localities where excavations were made 41

Chapter VII.

Stone lamps 67

Chapter VIII.

Pottery 69
Methods of cooking food of the ancient Kamchadal 69
Review of the relation of the Ainos to the Kamchadal 70
Pottery of the Ainos 72
Pots or pans with ears inside the vessels 73
A different kind of pottery to the north of Kamchatka 76
Bibliography 79
Index 83

ILLUSTRATIONS

PLATES

I. Types of Kamchadal men, women and girls.
II. A. Elders of villages of the Western Shore of Kamchatka.
B. Group of blind men and women of the village Kharyusovo.
III. Kamchadal boats bridged.
IV. A. Greek-Catholic Chapel in the village Kharyusova.
B. Kamchadal storehouse.
V. A. Author's camp on Cape Siwusk in Kuril Lake.
B. Ascending the rapids of Osernaya River.
C. Pulling the boats through the Rapids.
VI. A. Lance and arrow heads of flint and quartzite.
B. Lance and arrow heads of obsidian.
VII. 1–17. Stone knives.
18–29. Stone scrapers.
VIII. Stone blades of knives, lances and arrows and stone scrapers.
IX. Stone axes, adzes and chisels.
X. Stone fishing hook sinkers and a pestle.
XI. Stone implements and weapons.
XII. Bone awls and parts of weapons.
XIII. A. Bone implements.
B. Fragments of bone implements.
XIV. Stone lamps.
XV. Stone lamps.
XVI. Bone belt buckles, combs and implements.
XVII. Kamchadal pottery.
XVIII. Fragments of Kamchadal pottery.
XIX. Fragments of pottery of northern Kamchatka.

Map showing distribution of Palæolithic, Neolithic, Bronze and Iron Stations of Siberia, folded.

TEXT-FIGURES

PAGE

1. Kamchatka Peninsula 14
2. Map of Avacha Bay 42
3. A laurel leaf-like blade of dark grayish flint 44
4. Pit No. 1, Nalacheva Lake 44
5. Pit No. 2, Nalacheva Lake 45
6. Arrow blade of green jasper, Nalacheva Lake 44
7. Arrow flint blade, Nalacheva Lake 44
8. Pit No. 3, Nalacheva Lake 46
9. Blade of black obsidian, Nalacheva Lake 44
10. Stone pestle of quartz slate, Nalacheva Lake 44
11. Pit No. 4, Nalacheva Lake 46
12. Pit No. 1, Nalacheva Cape 47
13. Pit No. 2, Nalacheva Cape 47
14. Pit No. 3, Nalacheva Cape 47
15. Pit No. 4, Nalacheva Cape 47
16. Pit No. 5, Nalacheva Cape 47
17. Pit No. 6, Nalacheva Cape 48
18. Chisel of quartz schist 49
19. Flint blade 49
20. Sketch of Nalacheva Lake and Cape 48
21. Sketch of ancient site of Kulki River 48
22. Lance point of flint 49
23. Sketch of ancient site of Kavran River 48
24. Stone implement of black flint 50
25. Flint nucleus 50
26. Flint nucleus 50
27. Flint scraper 52
28. Stone pestle of quartz slate 52
29. Flint arrow-point 52
30. Flint blade 52
31. Bone arch of ancient Kamchadal dog-sledge 52
32. Stone implement of silicified black slate 52
33. Lance point of flint 52
34. Whetstone for polishing stone implements 52
35. Small arrow blade of flint 52
36. Obsidian blade 54
37. Obsidian scraper 54
38. Woman's tailoring knife of slate 54
39. Drill head of quartzite 54
40. Stone for grinding paints 54

PAGE

41. Bone knife for splitting willow-herb..... 54
42. Bone shovel for digging..... 54
43. Bone hook..... 54
44. Bone shovel for digging..... 54
45. Obsidian scraper..... 54
46. Stone pestle for grinding food..... 54
47. Obsidian blade..... 54
48. Stone hammer..... 54
49. Quartz pebble used in game called matka..... 54
50. Bone hook for hanging fish for drying..... 55
51. Fragment of a bone implement..... 55
52. Bone hook of reindeer antler..... 55
53. Scraper-like implement of quartzite..... 55
54. Pit of an ancient dwelling on the Osernaya River..... 56
55. Small flint arrow blade..... 55
56. Stone implement of silicified slate..... 55
57. Stone implement, not finished, of silicified slate. 55
58. Flint scraper..... 55
59. Adze of quartz schist..... 55
60. Scraper of silicified slate..... 62
61. Arrow blade of white chalcedony..... 62
62. Scraper-like implement of silicified slate..... 62
63. Map of the Kuril Lake..... 58
64. Stone lamp of sandstone..... 67
65. Stone lamp of porphyrite..... 67
66. Stone lamp of andesitic lava, in process of manufacture..... 67
67. Stone lamp on a wooden stand, of the present Kamchadal..... 68

PAGE

68. Stone lamp under a birch bark funnel, of the present Kamchadal..... 68
69. Bone comb of the Kurilian Ainos decorated with interwoven curves. Some of the teeth are broken..... 71
70. Bone comb of the Kurilians which might serve as an implement for decorating pottery..... 71
71. Fragment of a Kurilian bone comb, not ornamented, has a hole in the upper part, probably for suspending it by a cord..... 71
72. Fragment of a Kurilian bone belt buckle, ornamented with interwoven curves..... 71
73. Small belt buckle of the Kurilians, with a hole in the center..... 71
74. Bone case for fishing hooks of the Kurilians.... 71
75. Fragment of Kurilian pottery with an inside ear. 74
76. Another fragment of Kurilian pottery with an inside ear..... 74
77. Fragment of the lower part and bottom of a Kurilian clay vessel..... 74
78. Fragment of a Kurilian clay vessel with a drilled hole for mending..... 74
79. Outline of a Kurilian clay pot with ears inside.. 74
80. Fragment of ancient Aino pottery with an ear inside, from Yezo..... 74
81. Ancient Aino clay vessel with ears inside, from Yezo..... 74
82. Sketch of an iron pot with ears inside, of the Sakhalin Ainos..... 75
83. Iron pot with ears inside, of the Yezo Ainos.... 75

PREFACE

In 1925 the Carnegie Institution of Washington published my report, *Archæological Investigations in the Aleutian Islands.* The present work deals with the archæological investigations in Kamchatka, based on fieldwork conducted by the author in 1910–1911 at the expense of the late F. P. Riaboushinsky, Moscow banker, and under the auspices of the Imperial Russian Geographical Society. Both works form a part of the results of the author's studies as a leader of the Ethnological Division of the so-called Kamchatka Expedition, and may be regarded as publications, in English, of the Russian expedition. The reasons for the study of the Aleutian Islands by the Ethnological Division of the Kamchatka Expedition are given in my work *Archæological Investigations in the Aleutian Islands* (page 2).

The leaders and members of the other divisions of the expedition, who worked in Kamchatka only, are still working out their material. The following publications have appeared in Russian. Professor P. J. Schmidt, member of the Russian Academy of Sciences and leader of the Zoological Division, published the first volume of *The Zoology of Kamchatka*, Moscow, 1916 (1–432 pages, 4°). Professor V. L. Komarov, member of the Russian Academy of Sciences and leader of the Botanical Division, published the first volume of *The Vegetation of Kamchatka*, Moscow, 1912 (1–458 pages, 4°). Dr. V. A. Vlasov, the chief of the Meteorological Bureau of Moscow and leader of the Meteorological Division, published Volume I, Part 1, *The Climate of Kamchatka;* Part 2, *Kamchatka's Waters*, Moscow, 1916 (I–VII, 1–370 pages, 4°).

The above Russian publications of the Kamchatka Expedition were not written by the division leaders alone, but there are also contributions by their assistants, fifteen in number, specialists in different branches of zoology, botany, geology and meteorology.

The leader of the Geological Division, the mining engineer and member of the Geological Survey of Petrograd, S. A. Konradi, has published only a brief account of his investigations of the Kamchatka volcanoes. After the revolution of October 1917 in Russia he proceeded to Prague, Czechoslovakia, where he now lives.

The following material of the writer has not yet been published: grammars on the Aleutian and Kamchadal languages, and material on the folklore, history, anthropology, ethnology and sociology of the Aleut and Kamchadal. A handbook by the writer on the anthropology and ethnology of the peoples of Asiatic Russia and adjacent countries is now in print by the American Museum of Natural History in New York, and a volume on the Yakut people of Siberia (prehistory,

history, anthropology, language, folklore, ethnology and sociology) is now in preparation for the publications of the American Museum.

The specimens described in this book are on exhibition in the Central Museum for Ethnography (former Count Rumiantzev's Museum) in Moscow.

Acknowledgment is made to Professor B. M. Sokolov, the Director of the Central Museum for Ethnography in Moscow, and his assistant, Dr. B. S. Shukov, who supervised the work of illustrations; to the mineralogist, Professor A. G. Titov of the Moscow University, who determined the stone material for implements and weapons; to the scientific collaborator of the Central Museum, Madame E. I. Goryunova, and the artist, Mr. Gutentag, who made drawings from specimens of the Kamchatka collection; to the photographer of the Central Museum, Mr. P. N. Bashirov, for the photographs taken of specimens in the Central Museum.

Mr. N. N. Krijanovsky of the staff of the American Geographical Society in New York made drawings of the map showing the distribution of the palæolithic, neolithic, bronze and iron stations in Northern Asia and the map of Kamchatka Peninsula.

Mrs. Jochelson, as a member of the Ethnological Division of the Kamchatka Expedition, assisted me in excavating ancient Kamchadal village sites and in taking photographs during our fieldwork. As a Doctor of Medicine she made herself useful by treating the numerous Kamchadal patients.

Finally the author is under obligation to the American Museum of Natural History in New York for assistance in clerical work and for putting at his disposal office room while writing this report.

WALDEMAR JOCHELSON.

American Museum of Natural History,
New York, March 27, 1928.

Archæological Investigations in Kamchatka

CHAPTER I

HISTORY

In 1632 the Russian conquerors of Siberia settled on the Lena River and built a fortified town, Yakutsk, which they used as a central base for further military expeditions. In the course of these expeditions they reached Okhotsk and Bering Seas on the east, the Arctic Ocean on the north and the Amur River on the south.

In the year 1649 the fortress Anadyrsk, on the river of the same name, was founded by the Cossack Deshnev, who had traveled in boats from the mouth of the Kolyma River through Bering Strait to the mouth of the Anadyr River.

Since the founding of the fortress Anadyrsk, Cossack parties have imposed tribute on the Koryak living to the south of Anadyr. From the Koryak the Cossacks learned that the best peltries, such as sables, sea otters (*Enhydris marina*), and sea bears (*Otaria ursina*) were obtained by the Koryak themselves through exchange from Kamchatka. This discovery led to an expedition to the Kamchatka Peninsula.

In 1696, Atlassov, commandant of the fortress Anadyrsk, sent a detachment under the command of the Cossack Morozko to the peninsula of Kamchatka to verify the reports of its wealth in peltries. The following year, Atlassov undertook the journey himself. He sent Morozko with his detachment to the Bering Sea, while he advanced along the coast of the Penshina Bay, gathering tribute from the crossing country. Morozko did likewise on the coast of Bering Sea. Atlassov and Morozko met on the Tighil River where the Kamchadal territory begins. They advanced together, reached the Kamchatka River, received tribute from the Kamchadal who were living in the valley of the Kamchatka River, and founded the fortress Verkhne-Kamchatsk.

Thus the conquest of Kamchatka was begun. When the Russians had settled in Kamchatka, the Peninsula, as well as the Koryak territory to the north of it, became dependent upon the fortress Anadyrsk. The sea route from Okhotsk to Kamchatka was at that time unknown, and the land journey through the territory of the turbulent Koryak was considered quite impossible. In those days Kamchatka was the most valuable acquisition of the Russian Government in the Far East, and communications of the Yakutsk Administration with Kamchatka

had to be maintained over a long and dangerous route. The way from Kamchatka to Yakutsk lay through the entire Koryak country to the Anadyr River; from there to the Kolyma River over the Stanovoi Mountain; and from there the route lay over the Indighirka and the Yana countries and the Verkhoyansk range of mountains. A great number of the Cossack parties, which started from Kamchatka with tributes of furs, never reached the fortress Anadyrsk. The Koryak killed the Cossacks from ambush and kept the furs. Transports, that had safely reached Anadyrsk, would arrive in Yakutsk three years after they had left Kamchatka. Cossack detachments carrying provisions, gunpowder, arms and cannons from Yakutsk to Kamchatka were also harassed by Koryak attacks. To put an end to such conditions a direct sea-route from Okhotsk to Kamchatka had to be discovered, and the Koryak had to be finally subdued in order that the winter route might be rendered safe.

Until the sea-route from Okhotsk was discovered, the Cossacks of the Kamchatka Peninsula tried to utilize the Pacific Ocean route to shorten the dangerous land trip from Kamchatka to Anadyrsk. They built large boats of boards, and starting from the mouth of the Kamchatka River traveled northward to the mouth of the Alutor River. In 1752, in order to facilitate these expeditions, the Cossacks built a settlement, Alutorsk, protected by a wall, at the mouth of the Alutor River, where Cossack parties could find shelter against the attacks of the Alutor Koryak. During the winter, Cossacks traversed the tundra from the fortified settlement, Alutorsk, to the mouth of the Oklan River, a tributary of the Penshina River, on which a fortress, Oklansk, was built. From Oklansk they traveled northward along the valley of the Penshina River and, having traversed the Nalghinsk Mountains, arrived at the Anadyr River. That part of the way from Kamchatka to the Anadyr which lay between Alutorsk and Oklansk was of course not safe from unexpected attacks of the Koryak.

The unsuccessful attempt of 1712 to reach Kamchatka by sea from Okhotsk was followed in 1713 by a special ukase of Peter I, ordering that a sea-route to Kamchatka be found. All attempts, however, failed until 1716, when a successful journey was made from Okhotsk to Tighil in a large boat. Thus the dependence of Kamchatka on the Anadyr route was brought to a close, and communication between the peninsula and Yakutsk was henceforth carried on directly by way of Okhotsk.

THE BERING EXPEDITIONS

The discovery of a sea-route to Kamchatka gave an impetus to geographical explorations in Bering Sea. In 1726 the first expedition of Bering was undertaken, followed by a second in 1737–45. In the interval between these expeditions, which were scientific in character and had no direct relation to the administration of Kamchatka, the Kamchadal were finally subdued.

Professor Golder[1] is of the opinion that Peter I, on his own initiative, set on foot Bering's Expedition in order to determine whether Asia is united with or

[1] F. A. Golder, *Russian Expansion on the Pacific, 1641–1850*, Cleveland, 1914, p. 133.

separated from America, but there is reason to believe that he was influenced by the German philosopher, Leibnitz. The Russian historian, Vladimir Guerye,[1] found in the library of Hanover among Leibnitz's rough records a draft of a note, written in 1697, which evidently was destined for the Russian Czar. Among many other advices the note contains a recommendation to investigate Northeastern Asia in order to determine the connections between Asia and America. At that time a Russian embassy was passing through Hanover possessions and, as Professor Guerye suggested, Leibnitz's note might have reached the Czar through Mr. Leford, the Swiss adventurer and councilor of Peter the Great. The original of this note was, however, not discovered in the Russian archives. But there exist other traces of connections or direct correspondence between Leibnitz and the Czar. In a letter to Bruss in 1711 Leibnitz says:

"No one except the Czar can solve to the universe this doubt, and this may be regarded as a more glorious and important task than that which has been done by the Egyptian rulers in their time, relating to the investigation of the sources of the Nile."

In September 1712, Leibnitz sent to Bruss a note on the desirability of linguistic investigations and magnetic observations in Russia. At the conclusion he again touches the idea cherished by him, of the connection between the two continents,[2] accompanying it with considerations of great interest.

In a letter of October 26, 1713, to the Czar, writing from Vienna, Leibnitz again reminded him of the same plan. In 1716, Leibnitz and Peter the Great together passed about a week at the watering place of Pirmont (Braunsweig) and there is no doubt that they frequently spoke on this subject. Leibnitz wrote to Burge the following lines:

"The Czar is inquiring about all mechanical arts; but his main interest is concentrated on everything connected with navigation, and therefore he is fond of astronomy and geography. I hope that through him we shall be able to learn whether Asia and America are joined."

On June 22 of the same year he laid before the Czar in Pirmont, through Shaphiroff,[3] a memorandum in which he demonstrated, by points, what the Czar could do with glory in advancing civilization and science, and to clear up the question on the connections of Asia and America. Leibnitz repeats the same idea in another memorandum to the Czar, who also was evidently then in Pirmont. Thus the thoughts on the connection of Asia and America importunately occupied the mind of Leibnitz during twenty years, and he was constantly urging the Czar to solve this problem. Unfortunately wars, inner troubles and other affairs of state prevented the Czar from fulfilling Leibnitz's recommendation earlier, and it was only at the end of his life that he resolved to organize an expedition to solve the problem in which Leibnitz was so much interested.

[1] See Vladimir Guerye, On the Relations of Leibnitz to Peter the Great, according to the unpublished records of Leibnitz in the library at Hanover S. Pet. 1871, pp. 14, 18 (a separate of the Journal of the Department of Education); Collection of Letters and Notes of Leibnitz concerning Russia and Peter the Great, St. Pet. 1873, p. 19; published by the Imperial Russian Academy of Sciences. See also Professor L. S. Berg, *The Discovery of Kamchatka and Kamchatka Expeditions of Bering*, Leningrad and Moscow, 1924, p. 61 (all in Russian).

[2] *i. e.*, whether Asia is separated from America.

[3] Baron Shaphiroff was the vice-chancellor of Peter the Great.

A brief exposition of data relating to the personnel, routes and results of the Bering Expeditions follow, as they are closely connected with the history of Kamchatka and the fate of the Kamchadal.

BERING'S FIRST EXPEDITION

At the end of 1724 Peter I drew up the instructions for the Expedition, but he did not sign them until January 26, 1725. About a month after signing them the Czar died, but his plans were carried out by the Empress Catherine I. Before his death the Czar chose Bering to carry out the projected work.

Vitus (in Russian called Ivan Ivanovich) Bering was born in Denmark in 1680. He had been in the Russian service since 1704, and was an experienced and excellent seaman, an honest man and friendly to his subordinates, but too cautious and indecisive to conduct such a responsible enterprise as the Kamchatka Expedition. In addition to this he showed little interest in purely scientific problems. Nevertheless his expeditions accomplished a scientific task of utmost importance, and he met a heroic death on the island which now bears his name. Lieutenants Chirikov and Spanberg were given to him as assistants. Alexei Chirikov was one of the best Russian seamen of that time—bright, educated, modest and firm. Martin Spanberg, a Dane, was an excellent seaman, but rough and harsh and disliked by his subordinates.

Their route from Petrograd lay through Siberia to Okhotsk and from there to Kamchatka by water. I refrain from a description of the hardships, sufferings and losses to which the members of the expedition, and still more the aborigines of Siberia, were subjected. Only the results of the first Bering expedition may be mentioned here. When on August 13 the expedition reached the Bering Sea, latitude 65° 30′ north, Bering summoned his officers to consult as to what should be done. The officers were divided in opinion. Spanberg proposed to continue their course to the north until August 16 and then turn about. The opinion of Chirikov was that the expedition should sail to the west until the mouth of the Kolyma River was reached. Bering accepted the advice of Spanberg, and until the sixteenth the same northerly course was held. When in latitude 67° 18′, longitude 193° 7′ east from Greenwich the order was given to put about and set course for Kamchatka. March 1, 1730, Bering reached St. Petersburg after a five-years' absence. Bering himself was convinced that he had done his duty, but leading authorities in the capital did not hesitate to state that the two continents might be united somewhere to the west of the point reached by Bering's expedition.

BERING'S SECOND EXPEDITION

The critical attitude of scientists toward the results of the first expedition, and also the recognition by Bering himself that his first journey did not amply solve the problem assigned to him, led him to suggest another voyage. He suggested also, in a general way, to map the northern coast of Siberia.

Bering's propositions were favorably received and adopted after certain changes had been suggested by Chirikov. Bering's plan to survey northern Siberia was

greatly enlarged so as to cover the coast from Arkhangelsk to the Lena River (in four sections), and from Lena to the Anadyr River, a fifth section,[1] in order to prove beyond a doubt whether America and Asia were or were not united.

In December 1732 the Senate gave its official approval to the work undertaken. On February 28, 1733, the instructions were revised and put in final shape by the Admiralty College and confirmed without alteration by the Senate on March 16, 1733, but with the addition of some other points.

Bering was appointed the leader of the expedition, Chirikov his first and Spanberg his second assistants. Spanberg was to command a division of vessels to sail for Japan.

The Russian Academy of Sciences appointed the following scientists to join the expedition: the naturalist, Johann Gmelin; historian and geographer, Herard Miller; astronomer, Louis Delisle de la Croyère[2] with two assistants, the geodesists Andrei Krasilnikoff and Simeon Popoff. Gmelin and Miller were afterward replaced by G. W. Steller and G. E. Fisher. Among other scientific assistants should be mentioned the name of S. P. Krasheninnikoff, later an academician and author of the *Description of Kamchatka*. None of the scientists mentioned, except Steller and Delisle de la Croyère, who were members of the second Bering Expedition, went to sea with him, being engaged in the study of the history, geography, biology and ethnography of Siberia.

It was not until May 1741 that the vessels *St. Peter*, commanded by Bering himself, and the *St. Paul*, commanded by Chirikov, were ready to leave the Avacha Bay, Kamchatka. Before starting Bering summoned his officers, including the astronomer, for consultation. All were of the opinion that by sailing between east and south the American continent would first be reached, visiting en route the phantastic Gama Land. When America was located, the boats were to follow the coast in a northerly direction until they were between the parallels 64 and 66, the location of the most northeasterly point of Asia, and then sail due west and thus determine the relation between Asia and America. When that was done they should return to Kamchatka. But this plan was not destined to be carried out. June 20, 1741, between the forty-eight and forty-ninth parallels, the two boats were separated by shifting winds, never to meet again.

On June 23, Chirikov gave up looking for the *St. Peter* and, according to the general agreement of the officers, the *St. Paul* took up her course. Chirikov

[1] The five sections were: (1) Arkhangelsk to the Ob River; (2) Ob to the Yenisei; (3) Yenisei to Cape Taimyr; (4) Lena westward to Cape Taimyr; (5) Lena eastward to the Anadyr.

The routes of the first two sections were successfully carried out without the loss of men, although the exploration took more time than was originally estimated.

The head of the third section, the pilot Minim, failed to carry out his commission on account of being blocked by ice.

The fourth section was in the beginning affected by many difficulties and tragic incidents. The first chief, Lieutenant Pronchistcheff, and his wife died almost at the same time from hardships and exhaustion. Pronchistcheff's successor, Khariton Lapteff, carried out the work after many adventures.

The fifth section with a crew of fifty men was under the command of Lieutenant Lasinius. During the first winter scurvy broke out among the men. Lasinius was the first victim of the disease, followed by thirty-five others. His successor, appointed by Bering, Dmitry Lapteff, succeeded in reaching the mouth of the Kolyma River, but all efforts to sail farther east were fruitless. He then decided to go in the fall to Anadyr by dog teams. Reaching the Anadyr River by the way of the Great Anui River, he built row boats and went down to the mouth of Anadyr. Not finding a vessel there, as he expected, he returned by land to the Kolyma and from there to St. Petersburg.

[2] Brother of the famous astronomer, Joseph Nicolas Delisle.

reached America 36 hours earlier than Bering. On July 17 he was in view of the island now called Chichagov, under 57° 50′. He successively sent ashore two boats in order to look for an anchorage and to come in contact with the natives, but neither of these was ever seen again.

As there were no other boats, it was quite impossible to visit the shore for the purpose of getting fresh water, of which there was need, and therefore the officers decided to go back to Kamchatka as quickly as possible. On July 26 the *St. Paul* started back, on its way anchoring near some of the Aleutian Islands. The scarcity of water, lack of properly cooked food, sufferings from storms and exposure broke the health of nearly all the men, and out of seventy-five men, twenty-one lost their lives, among them Louis Delisle de la Croyère. The *St. Paul* reached Avacha Bay on October 8.

More gloomy was the fate of the *St. Peter*, commanded by Bering himself. After separating from the *St. Paul* and the unsuccessful search for it, the *St. Peter* continued its journey, changing its course several times. July 20, 1741, the vessel reached the American shore, namely the Kayak (St. Elias) Island. Up to June 25, the direction steered was south-southwest. On account of stormy weather the southwest course was kept until the thirty-first, when it cleared up sufficiently to sail northwest, and by this maneuver the *St. Peter* passed near Ukamak Island. On the third of August, in latitude 56°, the mainland came into view once more. Not being able to go farther to the westward, the boat sailed with easterly wind on a southerly course, and in doing so ran into the Kodiak group of islands. On August 7 there began one of those storms which made the return voyage so tragic. All of the ship's officers met on August 10 for deliberation and agreed that, owing to the lateness of the season, the fact that twenty-six men were down with scurvy and that about four hundred miles still separated them from Kamchatka, the idea of exploring the American coast should be given up and all haste made to reach Kamchatka.

After touching the Shumagin and other Aleutian Islands and experiencing the most violent storms, the *St. Peter* reached, on November 6, 1741, Bering Island, which at first was taken by the crew for Kamchatka. They remained on the island until August 13, 1742. Thirty of the seventy-seven men lost their lives from the time of leaving Avacha until January 8, 1742, when the last of the diseased men passed away. Bering himself died on December 8, 1741.

Thus Bering's second expedition to discover the western shore of North America did not solve the problem whether Asia is separated from America in the northern latitudes.

Accounts of the vain attempts of Russian navigators in the Arctic after Bering's expedition to reach the Bering Strait along the Siberia shore[1] are omitted.

[1] We must mention, however, the voyage of the Cossack Semen Deshneff in 1648. His starting point was the mouth of the Kolyma River and, according to his report, he reached the Anadyr River by water, rounding up the Chukchee Peninsula. Professor Golder (*Russian Expansion on the Pacific 1641–1850*, Cleveland, p. 94, 1914) gives little credit to Deshneff's account, while Professor Berg (*Information on the Bering Strait and its Shores before Bering and Cook*, Petrograd, 1920, pp. 31–24, in Russian), in criticising Golder's opinion, submits data which may support the correctness of Deshneff's account.

In 1778, Cook passed through Bering Strait, doubled East Cape and sailed along the northeast coast of Asia to Cape North.[1] This achievement stimulated the Russian Government in 1785 to send to the north coast of Siberia an expedition under Joseph Billings and Gavriil Sarycheff.[2] One of Billings' officers, Guilev, charted the shore from St. Lawrence Bay to Koluchin Island. Billings himself charted the Koluchin Bay. But there remained to double the Shelagski Cape. For a time it was doubted whether Shelagski was a cape. James Burney[3] advanced the theory that it was an isthmus connecting Asia with America. Ferdinand von Wrangell[4] rounded the Shelagski Peninsula by a dog team in February 1821. In February of 1823 he departed once more from the Kolyma River for Shelagski Cape, and reaching it he continued his march eastward to Koluchin Bay. His efforts, joined to those of Cook and Billings, proved finally that Asia and America were not united. In 1909 the whole shore from the mouth of the Kolyma River to the East Cape (or Deshneff Cape of the Russians) was charted by the military topographer, N. J. Koshevnikoff, and the geodesist, E. F. Weber, members of the Chukotski Expedition under the geologist I. P. Tolmachoff,[5] now curator of the Department of Invertebrate Palæontology of the Carnegie Museum, of Pittsburgh, Pennsylvania.

SPANBERG'S VOYAGE

One of the main aims of the Bering Expedition was to enter into friendly relations with Japan. Japanese captives brought to St. Petersburg gave detailed information on Japan, which aroused much interest in that little-known country. On the other hand the Japanese Government of that time forbade Japanese sailors to visit foreign countries, and the landing of alien navigators was limited to certain ports only.

Spanberg made three voyages to the shores of Japan in the years 1738, 1739 and 1742. In the first two voyages he had three vessels under his command; in the third, four. Spanberg was very cautious in exploring Japan's shores, always fearing to get into conflict with the Japanese authorities. He did not approach the coast, lying at anchor a mile from the shore, and Japanese visitors on his vessel were received with suspicion. Therefore his information on Japan was very scanty. A little bolder was one of Spanberg's assistants, Walton, the commander of the ship *Nadezhda*. In the voyage of 1739 he was separated from the other navigators by a storm, as Müller narrates.[6] Spanberg charged that Walton intentionally disappeared; Professor Berg[7] is of the same opinion. Walton sighted Nippon on June 16. The following day he came to a large city and coasted in sight of the shore, and sent the pilot Kasimeroff and seven sailors in a boat to the shore to fetch fresh water. Kasimeroff was invited and entertained by the owners

[1] James Cook, *Voyage to the Pacific Ocean*, London, 1784, vol. II, p. 466.
[2] See J. Billings, *Voyage*, London, 1802, ed. by Martin Sauer, p. 28 and Appendix; G. Sarycheff, *Account of a Voyage of Discovery*, London, 1806.
[3] J. A. Burney, *Chronological History of the North-Eastern Voyages of Discovery and of the Early Navigation of the Russians*, London, Chap. XXV, 1819.
[4] F. von Wrangell, *Siberia and the Polar Sea*, London, 1840.
[5] I. P. Tolmachoff, *Along the Chukchee Shore of the Arctic Sea*, St. Petersburg, 1911 (in Russian), with a map.
[6] G. F. Müller, *Sammlung Russischer Geschichte*, vol. III, pp. 168, 169.
[7] Berg, op. cit. p. 91.

of two houses, and some of the Japanese accompanied him to the Russian vessel, where they were treated by Walton and exchanged presents with him. Walton went farther south, and on June 22 came to anchor in sight of a large city. Junks which came to the ship were asked to bring fresh water. They complied with the request and offered to take the boat into the port, but Walton declined. In the meantime a boat approached the shore and an official in military dress forbade the Japanese to have further communication with the Russians.

It is very curious to note that the Japanese records[1] on Spanberg's and Walton's visits to Japanese waters, while giving dates in accordance with the Russian accounts, picture the intercourse with the Russian ships in the light of strict observance of the regulations concerning the isolation of Japan from foreign influence and suppression of Japanese navigation abroad by the Shogunate, issued about a hundred years before Bering.

Although Spanberg's and Walton's information concerning Japan was less satisfactory than might be expected, their explorations were valuable from the general point of view of geographical knowledge. They charted the southern part of Kamchatka, the Kurilian Islands and a part of Japan; they were the first to discover the route to Japan from the north; they demonstrated that the imaginary Land of Gama did not exist and that the so-called State Island and Company Land are two of the Kuril Islands;[2] that Yezo is a comparatively small island and not a continent, and that Japan is not a Peninsula of Tartary, as the old geographers believed.

[1] See Berg, *The Discovery of Kamchatka*, etc., p. 88.

[2] The visionary Gama Land Island was alleged to have been discovered in the Pacific by the Spanish navigator Juan de Gama on his voyage from China to New Spain in the seventeenth century. It appeared on a map for the first time in 1649. (See Paul Teliki, *Atlas zur Geschichte der Kartographie der Japanischen Inseln*, Budapest, 1909, p. 141; and F. A. Golder, *Bering's Voyages*, New York, Publication of the American Geographical Society, 1925, vol. II, p. 19.)

The alleged State Island and Company Land, which are really the Kurilian Islands Urup and Iturup, were discovered in 1643 by the Dutch navigator M. G. Vries (see P. A. Leupe, *Reize van Maarten Gerritszoon Vries in 1643 naar het noorden en oosten van Japan volgens het journaal gehouden door C. J. Coen, op het schip Castricum*, published under the auspices of the Koninklijk Instituut voor Taal-Land, en Volkenkunda van Nederlandsch Indie, Amsterdam, 1858. It was the first publication of the journal of Vries's voyage of 1643).

The astronomer, Joseph Nicolas Delisle, drew up for the second expedition under Bering a map of the Pacific on which De Gama and Company Land were indicated.

CHAPTER II

JAPANESE SHIPWRECKS NEAR KAMCHATKA SHORE

Restrictive legislation of the Shoguns, concerning Japanese navigation, tended to keep Japanese boats in home waters, but storms of the rough Japanese Sea often brought them to Kamchatka.

About the end of the seventeenth century one Japanese junk, after losing its mast in a storm, for six months was carried about by the currents until it was thrown up on the western shore of the Kamchatka Peninsula, not far from the mouth of the Opala River. Of the twelve Japanese who were in the junk, three were taken prisoners by the Kamchadal and nine succeeded in escaping in their junk in an unknown direction. Two of the three prisoners soon died from the Kamchadal diet, to which they could not become accustomed. The name of the Japanese who lived was Denbei. The Cossack chief Atlassoff, during his campaign in Kamchatka of 1697–1699, learned from the Kamchadal of their Japanese prisoner. He took him to Anadyr, and in 1701 he was brought to Moscow, and in January 1702 he was presented to Peter the Great. Denbei was the first Japanese who reached Russia and from him the Czar got his first information of Japan. At the order of the Czar, Denbei taught some Russians the Japanese language. The Czar promised to let him go home, but did not keep his word. Denbei was ordered to be baptised and received the name of Gabriel.

In 1710 another Japanese junk was wrecked on Kamchatka's shore to the north of Avacha Bay. There were ten Japanese, four of whom were killed by the Kamchadal and six taken prisoners. Some were taken from the Kamchadal by the Russian conquerors and kept in their fortresses where they were taught Russian. One of the prisoners, Sanime by name, was brought to St. Petersburg in 1714.

In July 1729 a third Japanese vessel was brought to Kamchatka, somewhere between Lopatka and Avacha, having on board 17 Japanese. It was a trading vessel which carried goods from Satzuma to Osaka. Soon after landing the Japanese were discovered by the Cossack chief, A. Stinnikov, and the Kamchadal accompanying him. At first the Japanese were well treated. When the Japanese saw that Stinnikov was plundering goods from their wrecked vessel, they tried to escape in a small boat, but Stinnikov ordered his Kamchadal to overtake and kill the Japanese. A part of them were killed by arrows, lances or sabers, obtained from the Japanese themselves. Some of them were drowned. Only two remained alive—a wounded boy, Gonza, and an adult Japanese, Soza, who were dragged from the water. When the news of the Japanese massacre reached the higher authorities an order was given to arrest Stinnikov, and he was hanged for his crime. Gonza and Soza were sent to European Russia. In 1734 they reached

St. Petersburg and were presented to the Empress Anna Ioanovna. In the same year they were baptized; Gonza was named Damian Pomortzev, and Soza, Kosma Shultz. They were charged to teach Japanese to the students of the Academy of Sciences. Neither lived long—Soza died in 1736 at the age of 43 and Gonza in 1739, being only 21.

Some years later (1745) other Japanese wrecked at Kamchatka's shore were brought to St. Petersburg for the same purpose, but the Japanese were simple fishers and hardly could be used as teachers.[1] Such wreckages of Japanese ships repeatedly took place about that time. The explorer Lesseps mentions nine Japanese whose ships were wrecked at the Aleutian Islands in 1788 and whom he brought to Kamchatka.[2]

THE UPRISING OF THE KAMCHADAL

THE CAUSES OF REVOLTS

The causes of revolts of the Kamchadal were the cruelty, violence, greediness with reference to fur-skins, and the licentiousness of the Cossack chiefs and soldiers on the peninsula. On the other hand frequent mutinies of Cossacks against their chiefs and the incessant feuds between the chiefs and their parties could not inspire respect from the oppressed natives. Numerous local revolts had taken place from the very beginning of the occupation of the country by the Cossacks. Rebels and victors were equally merciless in their encounters. A general uprising of the Kamchadal which had been fomenting for a long time broke out in 1731. The Kamchadal were ready to rise before that date but did not dare to do so.

In 1729 Kamchatka was visited by the first scientific expedition of Bering and his companions who had armed crews. The ship *Gabriel*, with a crew of one hundred men belonging to the military expedition of the Cossack chief, Afanassy Shestakoff, remained in Nishne-Kamchatsk until July 1731. According to the original plan of Shestakoff's military expedition, the *Gabriel*, after leaving Okhotsk, was to visit Kamchatka and to proceed from there to the mouth of the Alutor River, where the commander of the expedition, Shestakoff, expected to arrive by land from the shore of the Okhotsk Sea, in order to subdue the Alutor Koryak; from there it was intended that the ship should sail to the mouth of the Anadyr River, exploring the shores on the way, and continue up the river to the fortification at Anadyrsk, which Shestakoff intended to reach by land. But Shestakoff's party was defeated and he himself killed by the Koryak after he had crossed the Paren River. When the news of Shestakoff's death arrived, the *Gabriel* remained in Kamchatka, awaiting further orders. In June 1731 she was ordered to proceed to the Anadyr and to enter the service of Pavlutsky, Shestakoff's lieutenant.

As soon as the *Gabriel* had weighed anchor and gained the open sea, the Kamchadal attacked the fortress Nishne-Kamchatsk and took possession of it. Presently a detachment was despatched to take Verkhne-Kamchatsk and Bol-

[1] W. W. Barthold, *Die geographische und historische Erforschung des Orients mit besonderer Berücksichtigung der Russischen Arbeiten*, Leipzig, 1913, p. 130.

[2] M. de Lesseps, *Travels in Kamchatka*, English Translation from French, vol. I, London, p. 208.

sheretsk, and everywhere the Russians were slain. It so happened, however, that the *Gabriel* unexpectedly returned on account of an impending storm, not being prepared for a sea-voyage; and besides the crew were not eager to go to Anadyr. The sudden return of the *Gabriel* saved the Russians of the Peninsula. With the assistance of the sailors, Verkhne-Kamchatsk and Bolsheretsk were successfully held; Nishne-Kamchatsk was recaptured and the revolt was suppressed.

When the news of the revolt and its suppression reached Yakutsk the Administration resolved to send a commission to Kamchatka to investigate the cause of the uprising and the revolts of the Cossacks against their chiefs. At the head of the commission were Majors Mekhlin and Pavlutzky, former lieutenants of Shestakoff. The investigation lasted from 1733 to 1739. Sentences of death were passed by the commissioners on several Kamchadal chiefs and other instigators of the uprising, as well as on Cossacks convicted of criminal actions. Among the Russians executed was the Cossack officer Stinnikov, who in 1729 ordered the killing of the Japanese and robbed their ship, which was carried by the winds to the southern shores of Kamchatka.

SOME MENTAL TRAITS OF THE OLD KAMCHADAL

The old Kamchadal were proud, independent, inclined to wrath; their passions were easily aroused; they took offense readily and tried to avenge themselves by any possible means. They had no fear of death and could not be frightened. In order to demonstrate the psychology of the old Kamchadal some historical instances are cited of the relations between the Russians and Kamchadal before the final pacification of the latter.

In the winter of 1712 the Chief Antzyferoff with 25 Cossacks endeavored to collect tribute from the Avacha Kamchadal near where the fortress of Petropavlovsk was subsequently established. The Avacha Kamchadal were informed of the imminent arrival of the collectors. They built a solid blockhouse on posts with secretly lifting doors.[1] The Russians were met with simulated pleasure. Amidst mutual professions of friendship the transactions began, the Kamchadal readily surrendering a number of their principal men as hostages for their good behavior. At night they retired with the Cossacks to the pile-dwelling for sleep. But the natives planned to burn the building in the night and with it all the inmates. Their own men, however, were to escape through a secret passageway. But after the pile-dwelling was fired, they learned to their horror that their hostages had been chained by the Cossacks so that escape was impossible. The hostages, however, pleaded with their kinsmen outside to let the holocaust go on if, by perishing themselves, they could secure the destruction of the enemy, and so all in the building perished together.

Among the Kamchadal leaders of the revolt was the chief of Yelovka River, a tributary of the Kamchatka River, Tighil by name. When Nishne-Kamchatsk

[1] The old Kamchadal usually used such dwellings on platforms raised on piles as summer houses and now as storehouses.

was taken by the Russians, Tighil escaped to his fortified settlement in the mountains of Yelovka. Being pursued and overtaken by the Russians, he slaughtered his wives, children, kinsmen and dogs and killed himself.

One of the chiefs, sentenced to death as an instigator of the uprising, laughingly complained before the execution that he had the ill-luck to be hanged the last.

The present Kamchadal, however, have completely changed their psychology. They have a pitiful and humble appearance, and carry out each and every order of the Cossacks and the Russians in general. Evidently the process of Russianization, combined with two centuries of oppression by the Russian authorities, has brought about this change in the primitive character of the Kamchadal. This change, however, did not take place suddenly, but the tense energy of the people displayed in the general uprising was broken, never to recover. They became pacified.

THE YASSAK OR FUR TRIBUTE

The Kamchadal rebellions were chiefly caused by the extortionate demands made by the Cossacks and officials for furs and services for themselves. According to Krasheninnikoff[1] the Empress Elizabeth, after the general rebellion was crushed, issued an order limiting the yassak to one skin to a hunter of what ever animal he could bring; other historians of Siberia state it differently. The main factor attracting the Russians to Siberia in the early period of settlement was its wealth in furs. For one time furs were an important financial item in the budget of the Russian Empire; in the beginning of the seventeenth century the Treasury monopolized the fur trade. Czar Boris Godunoff decreed that the hunters and fur-traders deposit their merchandise in the Treasury for a fixed remuneration. The accumulated furs were placed in the care of a special department in Moscow, which disposed of them through its agents in Turkey, Persia, Bokhara and later in China. China in time became the largest and most profitable consumer of Siberian furs, for in exchange for its furs the Treasury would import from China gold and silver with which the Moscowite Empire paid for its wars. The China trade continued to be a Government monopoly until 1762. In that year Empress Catherine II abolished the official caravans to Peking, leaving the trade, which was still based chiefly on furs, in the hands of private merchants. The free fur trade had a stimulating effect on the development of commercial relations between Siberia, European Russia and the neighboring countries. The Treasury on the other hand no longer insisted that the tribute of Siberia be paid in furs exclusively. They were now free to pay their tribute in money, the amount being approximately estimated according to the value of the furs. Thus the field for official abuses was reduced, and the attitude of the natives toward the Russians began to improve.

Attempts to subject the Kamchadal coincides with the period of the Government monopoly in furs, when fur tribute was the cause for which thousands of men were tortured and killed whenever they refused or were not able to satisfy the rapaciousness of the foreign invaders. The situation of the Kamchadal was

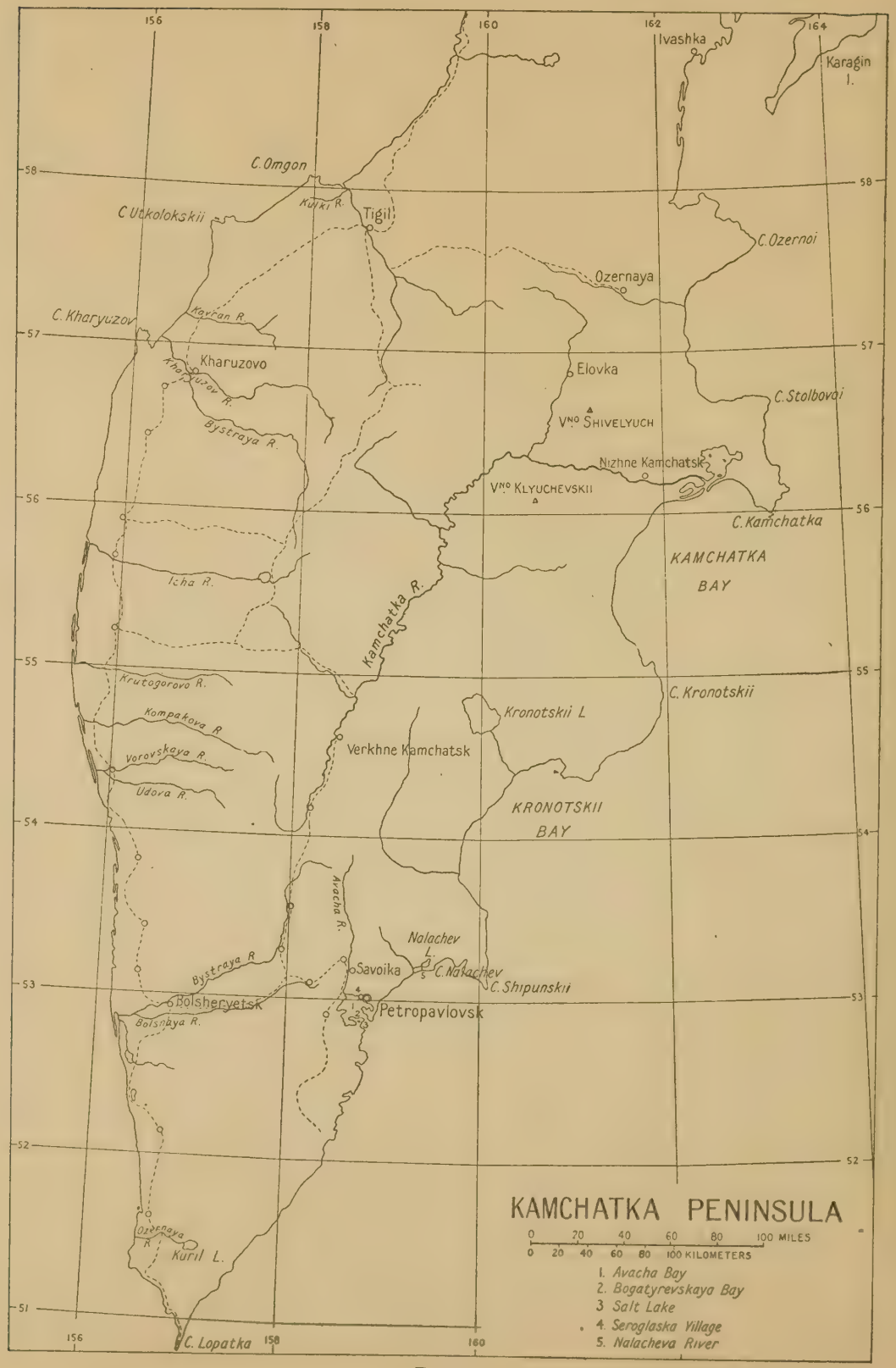
[1] Krasheninnikoff, part II, p. 387.

particularly tragic, as the sable, for whose fur the Russian demand was greatest, was an animal which inhabited Kamchatka and not the territories to the north of it.

The question as to how tribute was to be levied was later put on a definite basis by the so-called First Tribute (Yassak) Commission of 1762–1766. The reform introduced by the commission was based on the following principles: (1) The tribute is to be paid by a representative for the clan or group; the further apportionment of the tribute among the individual hunters is left to the natives themselves. (2) The representative of the group is to deliver the tribute in person to the administrative center; collectors are abolished. (3) Subject to the tribute are native men from sixteen to sixty years of age, who are to be called "workers" or "tax souls." (4) Payment may be made in furs or in money, the amount being calculated in money for each person, and varying in the case of fur payments according to locality, the nature of the animals and the current valuation of the latter. These principles, with some additions and a general lowering of the amount of tribute to be paid, were accepted by the Second Tribute Commission of 1828–1835. The age of workers was limited to men from eighteen to fifty. The number of workers of every clan was fixed by the census. The last census for this purpose was taken in 1859.

The fur-tribute, however, continued to be levied and to serve as a way to abuses for officials until the February revolution of 1917, when the Provisional Government under Kerensky abolished altogether this form of taxation of the Siberian natives.[1]

[1] The author contributed to the decree by his articles in the press on the Yassak question.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Ivashka
Karagin I.
C. Omgon
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C. Utkolokskii
Kutki R.
Tigil'
C. Ozernoi
Ozernaya
C. Kharyuzov
Kovran R.
57
Kharuzovo
Kharuzov R.
Bystraya R.
Elovka
C. Stolbovoi
V^no Shivelyuch
Nizhne Kamchatsk
V^no Klyuchevskii
56
C. Kamchatka
KAMCHATKA BAY
Icha R.
Kamchatka R.
55
Krutogorova R.
Kompakova R.
Vorovskaya R.
Udora R.
C. Kronotskii
Kronotskii L.
Verkhne Kamchatsk
KRONOTSKII BAY
54
Avacha R.
Nalachev
Bystraya R.
Savoika
C. Nalachev
C. Shipunskii
53
Bolshevetsk
Bolshaya R.
Petropavlovsk
52
Ozernaya R.
Kuril L.
51
C. Lopatka
KAMCHATKA PENINSULA
0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS
1. Avacha Bay
2. Bogatyrevskaya Bay
3 Salt Lake
4. Seroglaska Village
5. Nalacheva River

FIG. 1

CHAPTER III

THE COUNTRY AND SOMATOLOGY OF THE KAMCHADAL

GEOLOGICAL PAST OF KAMCHATKA

Professor Obruchev[1] says that at the end of the Miocene Epoch the western shore of Kamchatka was sinking, and Professor Bogdanovich[2] supposes that during the Pliocene Epoch a considerable part of the present western and eastern shores of the peninsula were still covered with water. The beginning of the Quaternary, says Obruchev, evidently formed a continental phase which set in after the sinking phase of the Mio-Pliocene Epochs; the land in Siberia reached its maximum extension; the Bering Strait did not exist as yet, and the Chukchee Peninsula was connected with Alaska, and therefore the northeast of Siberia must have had a milder climate than at present. But all these are geological periods which preceded the appearance of man.

The Pleistocene Epoch, which is associated with the existence of man, may be proved in the valley of the Kamchatka River, according to Bogdanovich, by the frequent occurrence of remains of the mammoth and the *Bison priscus*. But nothing is said about the remains of man. In many places of Siberia man was contemporaneous with the mammoth, but there is a question whether the same was true in Kamchatka. About the end of the Pleistocene Epoch, says Bogdanovich, there was an extensive glaciation in many places of Kamchatka.

These climatic changes do not interfere with our theory of the migration to America of the Siberian-Americanoid tribes, including the Kamchadal, in one of the Interglacial Epochs, and of their remigration to northeastern Siberia after it was released from the ice.

But especially on the Kamchatka Peninsula must it be noted that our theoretical considerations are proved by archæological evidence.[3] No artifacts of the palæolithic man were discovered by the author on Kamchatka, and it is possible that no man lived during the old stone age on the Kamchatka Peninsula. It remains, however, for the future to prove or disprove it. In order to clear up my doubts in this respect I communicated with my friend the Russian geologist, Professor I. P. Tolmachoff, now curator of the Department of Invertebrate Palæontology of the Carnegie Museum, Pittsburgh, Pennsylvania. He is well known by his explorations in northeastern Siberia. He writes that it is hardly proper to conclude that man lived in the Kamchatka River valley in the Pleistocene Epoch on the only ground that remains of mammoth and *Bison priscus* were found there. Mammoth and man very often were neighbors but, as it seems, this dependence

[1] W. A. Obruchev, *Geologie von Siberien*, Berlin, 1926.

[2] Karl Bogdanovich, *Geologische Skizze von Kamtschatka*, Petermann's Mitteilungen, Band 50, 1904, pp. 66, 198, 217.

[3] Waldemar Jochelson, *Archæological Investigations in the Aleutian Islands*, Pub. No. 367, Carnegie Inst. Wash., 1925. *Idem*, *The Ethnological Problems of Bering Sea*, Natural History, Jour. Amer. Mus., Jan.–Feb., 1926, vol. xxvi, No. 1, pp. 90–95.

was not necessarily mutual. Man might follow the mammoth in order to hunt him, but the mammoth had no need of man. Thus the remains of mammoth do not indicate that man lived in the same place, if there is no direct proof of it. However, the presence of the mammoth may postulate to climatic conditions fit for man to live in, and it remains for the future to find remains of the palæolithic man; but for the time being one may be right to hold to the theory of the peopling of Kamchatka in Recent Times, especially since no palæolithic artifacts were discovered in my excavations, and I feel authorized to say that the late peopling of Kamchatka may corroborate the theory of the reemigration of the Siberian Americanoids from America after the last glaciation subsided. To be fair, however, I must add that I had no time to make excavations in the Kamchatka River valley and that no regular excavations were made in the territory of the other Americanoids—the Koryak, Chukchee and Yukaghir.

GEOGRAPHY AND ADMINISTRATIVE DIVISIONS

The country of the Kamchadal—or the part of the Kamchatka Peninsula to the south, from the Amanino village to the west, and Osernaya River to the east—was a part of the Primorskaya Province. In 1909 a new province of Kamchatka was created, which included 6 districts: Okhotsk, Gishiginsk, Anadyrsk, Chukotsky, Commandor Islands and Petropavlovsky. The last district is the territory of the Kamchadal. The city of Petropavlovsk was made the capital of the province and the seat of a newly appointed Governor.

The former Territory of the Kamchadal is inhabited by 8,037 people, of which 3,370 are Russians, 3,555 Kamchadal, 802 immigrated reindeer Koryak and Tungus and 300 Chinese, Koreans and Japanese. There were also 10 Europeans and Americans.[1]

The Kamchadal have become Russianized and only the inhabitants of seven villages (between Amanino and Sopochnoye) of the western coast have preserved their native language—the western dialect of the Kamchadal language—and the inhabitants of the village Sedanka on the Tighil River speak the northern dialect. There were formerly four Kamchadal dialects, and at present even the Kamchadal, who speak two dialects, use more of a Russian-Kamchadal slang than the pure Kamchadal. The younger generation is learning Russian in the schools, and soon the Kamchadal language will be forgotten entirely, as was the case with the dialect of the Kamchatka River and with the southern dialect, which was spoken between the Great River (Bolshaya Reka) and Lopatka Cape. While the northern dialect of the Kamchadal on the Tighil River contains many Koryak words, the southern dialect had an intermixture of Kurilian words. Krasheninnikoff called the southern Kamchadal people Kurilians.

The Kamachdal had been and still remain a genuine fishing tribe. They did not adopt from their Koryak neighbors the reindeer, although they were

[1] According to official data of 1911. During the summer fishing season, Kamchatka's shores have many thousands of temporary dwellers. Russians who operate canneries and salteries bring thousands of laborers. The number of Japanese fishers at the time of my stay in Kamchatka was estimated at more than 10,000. About 250 Japanese schooners were lying near the shores and about ten Japanese steamers were coming from and leaving for Japan. According to the convention concluded after the Russian-Japanese War the Japanese were authorized to fish everywhere in Kamchatka waters except bays and river-mouths, but by bribing the guards they used to fish also in the inner waters.

hunting the wild Kamchatka variety of reindeer. Fish, different species of salmon, ascend the Kamchatka rivers in such abundance that they amply satisfy the needs in food. The Kamchadal have no time during the short fishing season to dry or smoke all the fish for the winter and the greater part of it is put in holes covered with stones and earth, and during the winter it is consumed in a decayed state by dogs as well as by men.

To a certain degree the Kamchadal of the western coast hunt sea mammals, but, not having skin boats, they do not go out to the sea, but kill those seals, white whales (*Delphinopterus leucas*) and sea lions (seldom) which enter the mouths of rivers in order to catch the ascending fish. Thong nets are put up for that purpose. They also kill seals, spearing and shooting them at their rookeries.

Horned cattle and horses were imported into Kamchatka chiefly from the Okhotsk district, i. e., of the Yakut race. In spite of the fact that they are badly cared for, they became acclimatized in Kamchatka and are a strong race of domestic animals. The Kamchatka horses are small, short necked, wide breasted and with short legs. During the winter they become covered with long thick hair, particularly their legs. Horses are used only in summer—as riding and pack animals. During the winter they are set free and have to graze from under the snow; rarely are they given hay and they therefore turn wild and have to be captured in the summer and trained again for riding.

Cow's milk plays at present an important rôle in the food of the Kamchadal and Russian inhabitants of the country. They use sweet as well as sour milk and pot cheese. Butter is rarely made, although the milk is rich in fat. But the Kamchatka cows give a small quantity of milk, about two or three quarts a day, as a result of scanty feeding in winter and of being kept in cold stalls. The Kamchadal make little hay, as the season for fishing and hay making coincide. One cow may be reckoned for every three inhabitants. The number of cattle may be estimated, according to the writer's census, at about 2,000.

Prior to the advent of the Russian the only domestic animal of the Kamchadal was the driving dog. The Kamchadal dog was regarded as the best and biggest driving dog of Siberia; at present, as a result of unfavorable conditions of life, it has become small in size. The dogs work hard during the long winter, but during the entire summer they are tied up, otherwise calves and colts and sometimes cows and horses are in danger of being torn by them. They are kept far from the village and poorly fed. Owing to the economic, climatic and topographic conditions of the country, the Kamchadal can not dispense with the driving dog, and every family has from eight to fifteen dogs. The number of dogs in 1911 in Kamchatka, according to my census, was more than 5,000. The old Kamchadal sledge for riding astride is no longer in use, the Russians having introduced the type of sledge used all over eastern Siberia. The dogs are harnessed to the sledge, being tied in pairs to a long thong.

There are no domesticated small animals, as goats or sheep and birds, in Kamchatka, as they would be exterminated by the ever hungry dogs, which very often find means to free themselves.

The Russian Government repeatedly tried to introduce agriculture and gardening into Kamchatka. For this purpose peasants from Southern Siberia and European Russia were transferred several times to Kamchatka, but all experiments have failed and the imported husbandmen turned to fishing and hunting. Only in the valley of the Kamchatka River, near the village Kluchevskoye, small sowings of barley are still being made, but without any economic importance.

Experiments with gardening appeared to be more successful. Potatoes grow all over Southern Kamchatka where the digging of edible roots had almost ceased. Turnips grow there and the inhabitants of Kluchevskoye also grow cabbage, which heads well.

CLIMATE OF KAMCHATKA

The following data on the climate of the Kamchatka Peninsula are based on observations made in 1908–1909 by the members of the Meteorological Division of the Riaboushinsky Expedition headed by Dr. V. A. Vlasov.[1]

As climate is one of the most effective nature-agents regulating human life, data concerning three chief regions of the country will be given: the western coast, the eastern coast and the central part, represented chiefly by the valley of the Kamchatka River. The western and the eastern shores represent maritime climates, while the climate of the central part may be characterized as a continental one.

The climate of the western coastline of Kamchatka is more severe than that of the eastern, due to the cold Okhotsk Sea. During the winter cold winds prevail, blowing from the Siberian continent, the region of the great Siberian anticyclone. A late spring and a cold summer characterize the climate of the western coast. On the eastern shore of Kamchatka, under the moderating influence of the Pacific Ocean, frosts in the winter are not so severe. Rain and snowfall are more abundant. However, the cold current arriving from the Bering Strait and the amount of ice which it brings delay the beginning of summer and reduce its temperature.

The climate of the central Kamchatka, confined by its western and eastern mountain ridges, i. e., the valley of the Kamchatka River, distinguishes itself by all the peculiarities of a continental climate, having a cold winter and a comparatively warm summer. In order to demonstrate what has been said of the three climatic regions, mean annual figures for three points are given: for Tighil on the western shore, Petropavlovsk on the eastern shore and Kluchevskoye in the valley of the Kamchatka River.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
Tighil	−20.0	−19.8	−13.6	−2.2	2.4	6.2	11.3	12.1	7.0	−1.0	−7.4	−17.2	−3.5
Petropavlovsk	−10.9	−11.2	− 7.0	−1.6	3.1	7.9	11.8	13.5	9.8	4.2	−1.8	− 6.6	1.0
Kluchevskoye	−16.4	−15.2	−11.3	−1.5	4.6	8.5	12.15	13.1	8.8	−1.4	−7.8	−18.0	−2.0

[1] See V. A. Vlasov, The Kamchatka Expedition of F. P. Riaboushinsky organized by the Imperial Russian Geographical Society, Meteorological Division, vol. I, part 1, *On the Climate of Kamchatka;* part 2, on *The Temperature of the Waters.* Moscow, 1916 (in Russian). Centigrade thermometers were used.

From this table it is seen that the climate of Tighil is much colder than that of Petropavlovsk and that the climate of Kluchevskoye, by its yearly and some of its monthly mean temperatures, is colder than that of Petropavlovsk, but by its summer temperature (May, June and July) it is warmer than that of Petropavlovsk.

Temperature of the soil. Monthly means, 1909.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Amplitude
Petropavlovsk:													
(1)	−10°5	−10°6	− 7°3	−0°5	8°8	14°5	17°6	15°6	10°9	.....	−4°7	−10°5	28°2
(2)	0.6	0.4	0.3	0.1	4.9	0.3	.....	13.4	10.9	.....	1.9	0.9	13.3
(3)	1.9	1.6	1.4	0.9	3.1	6.5	.....	12.1	10.4	.....	3.6	2.4	11.2
(4)	3.8	3.4	3.0	2.6	1.6	2.7	.....	6.8	7.1	.....	5.2	4.4	5.5
Kluchevskoye:													
(1)	−15.1	−17.3	−12.2	−2.4	10.2	15.6	19.3	15.9	.....	.....	−8.3	−19.3	38.6
(2)	− 9.5	−10.3	− 7.8	−3.1	3.5	9.3	12.8	12.4	.....	.....	−3.0	−10.4	23.2
(3)	− 1.2	− 2.6	− 2.8	−2.2	−0.8	0.0	2.0	4.0	.....	.....	1.7	0.1	6.8
(4)	1.4	1.0	0.7	0.5	0.4	0.4	0.4	0.4	.....	.....	2.7	2.1	2.3
Tighil:													
(1)	−15.3	−20.3	−14.0	−2.8	6.8	13.0	15.7	12.3	8.4	1.7	−6.1	−15.6	36.6
(2)	−11.9	−14.7	−12.0	−3.9	1.6	6.9	10.6	10.7	8.1	2.7	0.8	0.4	25.4
(3)	− 3.1	− 6.2	− 6.9	−4.4	−0.3	0.0	1.1	4.0	5.1	3.0	0.9	0.3	12.0
(4)	0.4	0.0	− 0.3	−0.9	−0.6	−0.2	−0.2	−0.2	0.0	0.3	0.3	0.2	1.2

(1) means on the surface; (2) means 0.25 meter deep; (3) means 1.0 meter deep; (4) means 2.0 meter deep.

This table is compiled from the numerous data on this subject by Vlasov, in order to show what time of the year may be regarded as the most favorable for making excavations in Kamchatka. In Petropavlovsk from May to September inclusive; in Kluchevskoye from July to September; in Tighil in August and September, and even in these two months we meet the freezing point at the depth of two meters. My own experience in that region gave still less favorable results. While digging on June 11 on the bank of Kulki River, a tributary of Tighil River, not far from the village Tighil, I met frozen soil at the depth of one foot and down. According to Vlasov only at the depth of more than 1 meter (3.28 feet) is the soil in Tighil frozen in that month.

SOMATOLOGY

The present Kamchadal have become mixed with Russian settlers and many have lost their former Koryak-like appearance, even in places where officially no Russians are recorded. The same may be said of the inhabitants of the southern villages, Yavino and Golyghino, who in former times might have been physically influenced by the Kurilians (i. e., the Northern Ainos). The Kurilians had intercourse with the Southern Kamchadal, and some Kurilians had settlements on the southern extremity of the Kamchatka Peninsula.

The measurements of Kamchadal taken by Mrs. Jochelson show that the Russian metisation influenced very little the physical character of the Kamchadal. 158 men and 170 women were measured. The following table gives some of the measurements and indices.

	Men		Women	
	Average	Stand. dev.	Average	Stand. dev.
Stature	1,597 mm.	5.4	1,495 mm.	4.6
Length of head	188 mm.	6.8	183 mm.	5.7
Width of head	149 mm.	5.7	144 mm.	4.8
Cephalic index	78.9	2.9	78.5	2.7
Width of face	144 mm.	5.7	137 mm.	4.3
Cephalic facial index	96.5	3.3	94.9	3.0

The Kamchadal, prior to embracing Christianity, threw away their dead to be devoured by dogs, and therefore no skeletal remains were found while excavating prehistoric sites. Only in one pit on the mouth of the River Kavran were prehistoric human bones discovered, and among them were two skulls in good condition for measurement.[1] One of the skulls seemed to be that of a woman, the other of a man. The length of skulls was 177 mm. and 188 mm., the width 136 mm. and 143 mm. and consequently the indices 76.9 mm. and 77.9 mm. According to Broca 2 units may be added to the cephalic index of skulls to obtain the cephalic of the living. Adding 2 units to 76.9 and 77.9 mm. we have 78.9 mm. and 79.9 mm., figures nearly equal to averages of the cephalic index of the present-day Kamchadal.

Plate 1 shows photographs of Kamchadal men, women and young girls. Plate 2, figure 1, represents elders of some villages of the western shore of Kamchatka.

SANITARY CONDITIONS AMONG THE KAMCHADAL

The Russian conquerors have exercised a disintegrating influence on the family life of the Kamchadal. Among the Kamchadal, unchastity has been more or less common in the case of girls before marriage and of women after marriage. The Russians made liberal use of this custom and in this manner syphilis brought by them was widespread among the Kamchadal. This contagious illness resulted in different inherited diseases. In twenty-six villages of the western coast of Kamchatka, out of a population numbering 2,500, 250 people (i.e., 10 per cent) were, according to my census in 1911, cripples (blind, deaf-mute, humpbacked, lame persons and so forth); particularly were there many blind people, an average of 1 per cent, and half of the population was suffering from eye diseases. Plate 2, figure 2, shows a photograph of 11 blind men and women of the village Kharyusovo, which has 200 inhabitants; i. e., 5.5 per cent of the population are blind.

These observations refer to the year 1911 and it would be fair to relate observations of later years.

Dr. Shirokogoroff,[2] basing his statement on a recent (1919–1920) medico-statistical survey by Dr. Puxov who put his material at his disposal, says that some

[1] One skull was discovered on the Kuril Lake (see p. 62), but it was not in good condition for measurements.

[2] S. Shirokogoroff, *Northern Tungus Migrations in the Far-East*, The Journal, North China Branch, Royal Asiatic Society, vol. LVII, 1926, p. 174.

groups in Kamchatka after being exposed to syphilis, alcoholism, tuberculosis and other consequences of Russian influence, show a marked increase over the former number. But these general observations are not corroborated by statistical figures.

The well-known investigator of Siberia, Patkanoff,[1] has shown that the groups which had adopted a higher system of economical organization (cattle breeding, agriculture, etc.) show a marked increase in population. But these groups do not include the Kamchadal. On the other hand the latest investigators of Kamchatka, the Swedish traveler Bergman[2] and the Russian Gapanovich,[3] attest the same state of affairs as pictured by the author. Only the infusion of fresh blood may save the Kamchadal from extinction. And the Kamchadal are conscious of it. I remember that some Russian adventurers coming from Vladivostok after the Russian-Japanese War were welcomed and adopted by the villagers of the western coast of Kamchatka, and the hunting rights of their territory were extended to them, provided they settle there.

[1] S. A. Patkanoff, *On the Increase of the non-Russian Population in Siberia*, published by the Imper. Russian Academy of Sciences, St. Petersburg, 1911 (in Russian).

[2] Sten Bergman, *Vulcane, Bären und Nomaden—Reisen und Erlebnisse im wilden Kamtschatka*, Stuttgart, 1926, Chapter: "Durch sterbende Dörfer längs der Küste des Ochotskischen Meeres," pp. 177–180. German translation from the Swedish.

[3] I. I. Gapanovich, *The Native Population of Kamchatka*, North Asia, Jour. Social Science, Moscow, 1925, No. 5, pp. 40–52 (in Russian).

CHAPTER IV

THE STONE AGE IN SIBERIA AND ADJACENT COUNTRIES

Before describing the excavations in Kamchatka a brief survey of the Stone Age in Siberia and adjacent countries will be given. Various discoveries concerning the palæolithic and the neolithic periods were made by Russian explorers in Siberia, but the archæological work in Siberia is still in its initial stage. Particularly, this may be said of the palæolithic. While some of the sites alleged to be palæolithic may be subject to doubt as to their antiquity, there may be palæolithic stations not yet discovered.

THE SIBERIAN PALÆOLITH

Professor Kastchenko, when excavating near Tomsk in 1896, discovered bones of a young mammoth, which had been killed and eaten by palæolithic hunters. There were found ashes, charcoal, fragments of stone knives and burnt leg-bones of the mammoth, which were split for the marrow. Professor Kastchenko[1] is a zoologist and showed little interest in archæological objects which accompanied his find. The implements were not described and classified. They are illustrated by a photograph and not by drawings, so one can not get a clear idea of their characters. No traces of the man himself were discovered.

Another palæolithic site was discovered in 1884 on the slope of the Afontova Mountain near Krasnoyarsk by the Siberian scientist, I. T. Savenkov. He collected a great number of implements which were deposited in the Museum of Anthropology and Ethnography of the Academy of Sciences in Petrograd and are still not described. In 1914 the Russian Academy of Sciences commissioned him to continue his excavations near Krasnoyarsk, but he died before finishing his work.[2] Professor B. E. Petri is inclined to regard Savenkov's collection as representing two cultures—the palæolithic and neolithic. Only typologically palæolithic specimens may be picked out from the collection.

From 1919 Savenkov's work was continued by G. P. Sosnovsky, G. von Merhart[3] and others. Von Merhart is a German scientist who spent some time in Siberia as a war prisoner. The archæologists mentioned carried on Savenkov's

[1] N. F. Kastchenko, *Remnants of a Mammoth found near Tomsk*, Bull. Russian Academy of Sciences, 1896, vol, v, No. 1, p. 31 (in Russian); *The Skeleton of a Mammoth with Traces of being used as Food of some Parts of its Body by Contemporaneous Man*, Memoirs Russian Academy of Sciences, Series VIII, vol. XI, No. 1, 1901 (in Russian); *Ein von Menschen verzehrtes Mammuth*, Correspondenz Blatt der Deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte, 1896, p. 45.

[2] Savenkov published some brief reports on his excavations near Krasnoyarsk, which contain more geological than archæological data. He was a geologist by profession. These reports are: (1) *On the Palæolithic Epoch in the Environs of Krasnoyarsk*, a supplement to the Report of the Society of Medical Men of the Yeniseisk Province of 1892 (in Russian). (2) *On the Vestiges left on the Banks of the Yenisei by Man contemporary with the Mammoth*, Report of the General Meeting of the Society of Naturalists at the University of Warsaw, year VII, p. 7, 1896 (in Russian). (3) *Sur les Rests de l'époque paléolithique dans les Environs de Kranoyarsk*, Congrès international d'archéologie préhistorique et d'anthropologie, onzième session a Moscou, vol. I, Moscou, 1892.

[3] G. von Merhart, *The Palæolithic Period in Siberia; Contribution to the Prehistory of the Yenisei Region*, American Anthropologist, vol. 25, 1923, pp. 21–55.

investigations. They made excavations in the Yenisei Valley to the south of Krasnoyarks and discovered microlithic artifacts characterizing the end of the palæolithic period. However, on the same level were found artifacts which may belong to one of the epochs of the lower as well as of the upper palæolithic period, and Merhard for the present limits himself by designating the Old Stone-Age culture of the Yenisei as belonging to the upper palæolithic stage with a Siberian facies.

At a distance of 330 miles from Krasnoyarsk to Minusinsk, twenty alleged palæolithic stations are at present counted in the Yenisei Valley, twelve of which are undoubtedly palæolithic.

One palæolithic station was reported from the Ob region. M. D. Kopytoff discovered a palæolithic stratum in 1911 in the village of Fominskoye, 13.2 miles from the city of Biisk, to the southwest of it, at the confluence of the Bii and Katun Rivers, on a high terrace of an ancient river sediment. The specimens collected are now in the American Museum of Natural History in New York, to which Mr. Kopytoff forwarded them.

In the Angara Valley, palæolithic finds were made in 1871 by I. D. Chersky[1] and A. Chekanovsky,[2] but the artifacts discovered by them are now missing. They were probably lost in the fire of 1879, which destroyed the Museum of the Geographical Society in Irkutsk, where the specimens were deposited. M. P. Ovchinnikov[3] found in the environs of Irkutsk many specimens of palæolithic culture, which are on exhibition in the Museum of Irkutsk.

Professor B. E. Petri[4] recently made excavations on the Verkholensk Mountain near Irkutsk and discovered typical stations on the loess belonging to the upper palæolithic epoch. He is convinced they are related to the Magdalenian, but with many special characteristics. Among the numerous artifacts of stone, bone, horn and tusks found in Siberian palæolithic stations, ornamentation is almost lacking on the objects, except plain lines engraved on one artifact made of horn. This lack of works of art may bear witness to a less artistic skill of the palæolithic dwellers of Siberia as compared with their companions of the far west, who left us nice patterns of sculpture and painting, to mention only the wall engravings and drawings of the Aurignacian Epoch and the bone carvings and mural paintings of the Magdalenians in representing man and animal forms. There were found, in fact, on the Verkholensk Mountain such materials for painting as graphite, hematite and lime, but no traces of their use were seen. The culture of the Verkholensk Mountain revealed, speaking in chronological terms of West-European archæology, a mixture of Aurignacian and Mousterian scrapers, of laurel leaf-like stone blades typical for the Solutrean period, and of nicely made harpoons of the Magdalenian period. This diversity of forms belonging to different stages of

[1] I. D. Chersky, *A Few Words on the Excavated Artifacts of the Stone Age near Irkutsk*, Bull. Siberian Division Russian Geographical Society, vol. III, No. 3, pp. 167–172 (in Russian).

[2] A. Chekanovsky, *A Brief Account on the Results of the Investigations during the Summer 1871*, Bull. Siberian Division Russian Geographical Society, vol. I, No. 5, pp. 37–38 (in Russian).

[3] M. P. Ovchinnikov, *Materials for the Study of Remains of Ancient Sites in the Environs of Irkutsk*, Bull. East Siberian Division Russian Geograph. Society, vol. XXXV, No. 3, pp. 62–76 (in Russian).

[4] See Professor B. E. Petri, *The Siberian Palæolith*, Irkutsk, 1923; *The First Traces of the Pre-Historic Man in Siberia*, Chita, 1922.

culture and occurring together appears to reveal a specific peculiarity of the Siberian palæolith, as the mixture of ancient and newer styles clearly comes forth in the excavations of many investigators. While Siberian palæolithic sites have yielded samples of human artifacts, no skeletal remains of the palæolothic man have been discovered in Siberia as yet.[1]

The palæolithic man of Siberia knew the art of fire-making, produced stone and later bone implements. Palæolithic sites on which bone artifacts were found may be regarded as stations of the late palæolithic period.

In summing up the data on hand on the Siberian palæolithic sites we may state that they are concentrated in southwestern Siberia, namely, in the valley of the upper course of the Ob River, in the upper course of the Yenisei River and on the banks of its tributary, the Angara River. (See map showing stations of the Stone and Metal Ages in Siberia.)

PALÆOLITHIC REMAINS IN INNER MONGOLIA

The French Jesuit explorers and archæologists, Teilhard de Chardin and F. Licent,[2] have recently reported the discovery of four palæolithic sites in Inner Mongolia. They think that almost everywhere in the loess of China similar palæolithic sites may be easily found. But the worker himself of the palæolithic implements, the Old Man of China, is still to be discovered.

A little to the north of the region where the Jesuit explorers, Père Licent and Abbé Teilhard de Chardin, were working on a gravel plain just above and behind the Little White Lake, N. C. Nelson, according to R. C. Andrews,[3] discovered old stone age implements. They were hammer-stones and scrapers, crudely shaped but definite in design and of the type known in Europe as Mousterian, contemporary with Neanderthal man. In a chapter on "the Dune Dwellers of Mongolia" Dr. Andrews refers to a site at Shabarakh Usu, at which remains of a late palæolithic culture were discovered. Above this layer was a transition stage, resembling the Azilian of western Europe, which gradually developed into the neolothic age. Stone points for arrows and spears and crude pottery characterized the upper layer. As we shall see later on, Nelson himself is not so positive of the finds indicated above as of artifacts of the palæolithic man.

THE SIBERIAN NEOLITH

As has been stated by archæologists of Western Europe, neolithic levels are often separated from the palæolithic by the intercalation of a sterile bed, indicating

[1] In Western Europe skeletal remains of the palæolithic man were found in numerous palæolithic sites of different epochs.

[2] See Teilhard de Chardin and F. Licent, *On the Discovery of a Palæolithic Industry in Northern China*, Bull. of the Geological Society of China, vol. III, No. 1, Peking, 1924, pp. 45–50.

—— *On the Geology of the Northern, Western, and Southern Borders of the Ordos, China*, Bull. of the Geological Survey of China, vol. 3, No. 1, Peking, 1924, pp. 37–44.

One of these authors, the Rev. Emile Licent, had published a comprehensive work under the title: *Dix Années (1914–1923) dans le Bassin du Fleuve Jaune et autres Tributaires du Golfe du Pei-Tcheuly*, 3 vols. text, 1 vol. tables; an atlas of 154 sheets. Published by the Librairie Francaise, Tientsin, 1924. In this work Père Licent refers to some finds of Neolithic remains and fragments of skulls of little significance, but the main interest centers about certain palæolithic remains belonging to the Mousterian epoch. Worked flints of Mousterian type were discovered at several different places, but in greatest abundance near the Great Wall of China about Choei-tong-keou.

[3] Roy Chapman Andrews, *On the Trail of Ancient Man*, New York-London, 1926, pp. 309 and 276.

a more or less lengthy period without occupation. We have seen before the dual character of some stone age stations in Siberia, thus indicating a certain continuity in the transition from the old to the new stone period.[1] It remains, however, for future investigators to solve the question whether the Siberian neolith in general shows a new order of things and the arrival of peoples with different industries and customs from those of the last palæolithic peoples. Leaving this question open we shall enumerate those neolithic stations in Siberia which are known at present. Neolithic sites are more numerous than the palæolithic. They are scattered all over Siberia, from the Ural Mountains to the Pacific coast. The following neolithic sites are known:

A neolithic station near the village Samarovskoye (60° N. lat.) in the Beresov district of the Tobolsk Province is mentioned by Count Uvaroff.[2]

In extreme northwestern Siberia the following neolithic stations became known.

Neolithic remains on the bank of the Sosva River, tributary of Ob at 63° N. lat., were discovered by Professor S. I. Rudenko.[3]

Finds of neolithic stone implements in the mouth of the River Ob are mentioned by Poliakoff.[4]

Neolithic artifacts were discovered still farther north of the Ob River on the Stchutchya River, not far from the Kara Sea (about 65° N. lat.).

Novitzky[5] discovered a neolithic site in the delta of the Ob River, and Count Uvaroff mentions a neolithic station near the village Obdorsk (67° N. lat.)[6]

The most northern neolithic station in Siberia as yet discovered is the locality of the village Dudinskoye on the Yenisei River, not far from its mouth (69° N. lat.).[7]

Neolithic stations were also reported from southwestern Siberia. Several neolithic sites were found on the shores of the Transuralian lakes and between the eastern slope of the Ural Ridge and the middle course of the Ob River and its tributaries.

In the southern part of the Province Tobolsk, on the Andreyevsky Lake, near Tyumen interesting village sites of neolithic man were discovered in 1885 by Slovtzoff.[8] According to the examinations of this investigator the Andreyevsky Lake must be regarded as the remains of a vast fresh-water basin on the shores of which neolithic man lived in small settlements surrounded by walls and trenches. He was fishing and hunting and left behind rich remnants of neolithic ceramics and polished stone implement.

There were discovered neolithic sites on the banks of the rivers Tobol and Ishim, both tributaries of the Ob River.

Mr. Kopytoff, mentioned before, discovered in 1912 two neolithic stations in the headwater district of the Ob River, one 17 miles from Biisk and another 2 miles lower. Artifacts found in these stations are in the American Museum of Natural History, New York.

In southern Siberia neolithic stations are known as far south as the boundaries of Mongolia.

Neolithic finds in Minusinsk on the upper course of the Yenisei River were reported by Savenkoff, Peredolsky and Teploukhov,[9] and in Kansk a district town of the province of Yeniseisk located

[1] It would not be superfluous to note that when a site yields typologically mixed artifacts in one horizon we have to range ourselves chronologically with the objects of the later period, as very often old-fashioned objects continue to be used or even manufactured after the adaptation to a new order of things. The author found in use the most primitive stone implements by Siberian natives, who have used or even manufactured metal objects for a long time. Likewise when we find a treasure of coins of different periods in one place we must refer the date of the deposit to the time of the circulation of the newest coins.

[2] A. C. Uvaroff, *The Archæology of Russia*, vol. II, p. 104, 1881 (in Russian).

[3] Professor B. E. Petri, *The Siberian Neolith*, p. 31 (in Russian).

[4] I. S. Poliakoff, Report of the Siberian Division of the Imperial Russian Geographical Society for the year 1868 (in Russian).

[5] W. M. Novitzky, *The Dune Sites in the Delta of the Ob River*, Memoirs Society Natural History of Kasan University, vol. XLIX, part 1 (in Russian).

[6] Count A. C. Uvaroff, *The Archæology of Russia*, vol. I, *The Stone Age*, 1881 (in Russian).

[7] See Petri, *The Siberian Neolith*, Irkutsk, 1926, p. 31 (in Russian).

[8] J. G. Slovtzoff, *The Finds of Objects of the Stone Age near the City of Tyumen*, Memoirs West-Siberian Division Russian Geographical Society, vol. VII, part I, pp. 1–59 (in Russian).

[9] J. T. Savenkov, *The Stone Age on the Country of Minusinsk*, Moscow, 1897 (in Russian). See also Baron de Baye, *Rapport sur les découvertes faites par M. Savenkoff dans la Sibérie Orientale*, Lecture à L'Académie des Sciences, Paris, 1894.

V. V. Peredolsky, *On the River Yenisei and its Tributaries*, Bull. Russian Geographical Society, Petersburg, vol. XXXII, part III, pp. 210–214 (in Russian).

S. A. Teploukhov, *An Account on Excavations of Neolithic Burial-places in the Valley of the River Yenisei in 1920 and 1921*, The Geographic Messenger, 1922, vol. I, p. 21 (in Russian).

on the Kansk River, a tributary of the Yenisei, by Yermolayeff.[1] But in general the Yenisei River valley yielded as yet very few artifacts of the Stone Age.

Richer in neolithic specimens is the valley of the Angara River, tributary of the Yenisei. The Angara country is mentioned by Ovchinnikoff and Sosnovsky.

In the environs of the city of Irkutsk neolithic finds were discovered by many investigators: Ovchinnikoff, Petri, Vitkovsky, Yeleneff and others.[2]

Neolithic sites were discovered in the village Yershi, 10 miles from Irkutsk, and near the village Rasputino in the Balagansk District of the province Irkutsk.

In the province of Irkutsk, Vitkovsky has excavated neolithic relics of an archaic character, finding human skeletons covered with red ochre, like those of the reindeer age in Europe.[3]

The alleged palæolithic sites discovered by N. N. Agapitoff in the valley of the Unga River (in the Balagansk District of the Irkutsk Province) and by A. J. Linkov in the village Stchukino near Irkutsk appeared to be neolithic stations, after further careful investigations.[4]

To the northeast of Irkutsk, Professor Kozmin discovered a neolithic site in the Kirensk District of the Irkutsk Province on the Small Patom River, a tributary of Lena.[5] Ovchinnikoff discovered a neolithic site on the banks of the Olekma River, a tributary of the Lena.

In the region of the Baikal Lake several very interesting excavations were made. The most important is the discovery by Professor Petri of neolithic sites in the Pestchana Bay of the Baikal Lake, and particularly the site Ulan-Khad situated on the shore of a little cove in the Mukhor Bay. The cove is surrounded by high rocky mountains from the south, west and east, and only the northern winds bring gravel and sand from weathered summits around the lake. Checked by the rock in the back of the bay the sand was deposited on the shore in horizontal layers, about 10 meters high. Cultural remains were found in eleven layers to the depth of 4 meters.

Under the eleventh layer no traces of man's activities were discovered. The same refers to the upper layers, 0.9 meters thick, which were without cultural remains. Thus the layers containing cultural remains formed a deposit 2.95 meters thick. The tenth and eleventh layers were difficult to dig on account of the ever frozen soil. The site yielded innumerable specimens of neolithic culture.

[1] A. K. Yermolayeff, *To the Archæology of the Environs of Kansk*, Siberian Archives, 1912, No. 4, pp. 237–243 (in Russian).

[2] N. I. Vitkovsky, *Report on Excavations of Burial Places of the Stone Age on the Left Bank of the Angara River in the Province of Irkutsk, made in the summer of 1881*, Bull. East-Siberian Division Imperial Russian Geographical Society, vol. XIII, No. 1–2, pp. 1–36.

M. P. Ovchinnikoff, *The Diary of N. L. Vitkovsky Written While Traveling on the Angara*, Siberian Archives, 1912, No. 10.

I. P. Sosnovsky, *The Prehistoric Remains of the Village Rasputino on the Angara*, Irkutsk, 1924, publication Irkutsk Scientific Museum.

M. P. Ovchinnikoff, *Materials for the Study of Ancient Remains in the Environs of Irkutsk*, Bull. East-Siberian Division Russian Geographical Society, 1904, vol. XXXV, No. 3.

N. I. Vitkovsky, *The Results of Excavations of Ancient Burial Places of the Stone Age*, Bull. East-Siberian Division Geographical Section, 1880, vol. XII, No. 1, p. 6.

A. Yelenev, *A Note on the Archæology of the Environs of Irkutsk*, Bull. East-Siberian Division Russian Geographical Society, 1894, vol. XXV, No. 1.

B. E. Petri, *Neolithic Finds on the Shores of the Baikal Lake*, Memoir of the Museum for Anthrop. and Ethnogr., Acad. of Sciences, 1916, vol. 3. All these papers are in Russian.

[3] M. Boule, *Fossil Men: Elements of Human Palæontology*, Translated from the French, London, 1923, p. 355.

[4] See Petri, *The First Traces of the Prehistoric Man in Siberia*, Chita, 1922, p. 2 (in Russian).

[5] N. M. Kozmin, *Remains of the Stone Age in the Valley of the Small Patom River*, Bull. East-Siberian Division of Russian Geographical Society, vol. XXIX, Part 1 (in Russian).

Many generations of neolithic man lived there during a long period of time. The lower layer, the eleventh, contained only stone-chips, blades nuclei, scrapers and fish-hooks. No objects of bone and wood, the manufacture of which was undoubtedly richly developed, were found, as sand is not a medium to preserve such material from decay. Except for some charred pieces, bone was not preserved, even in the upper layers.

The eleventh layer did not contain, however, either pottery remains or polished stone implements and therefore may be regarded as a transitional layer from the palæolithic to the neolithic period. Pottery begins with the tenth layer, representing crude clay vessels, conical in shape and with traces of basketwork on the walls or of application of stamps. The pottery technique, concerning firing and decoration, became perfected with every layer, and the polishing of stone implements became more accomplished. In the first layer polished adzes of nephrite were met. Generally the upper layer seems to approach the bronze epoch, although no bronze artifacts were found here. Thus we see in the scope of eleven layers a range of neolithic stages, beginning with the stage without ceramics and ending with a transitional stage to the bronze epoch.[1] In the Olkhon country and on the Olkhon Island in the Baikal Lake, neolithic sites were discovered by Khoroshikh.[2] Dr. Talko-Hryncewicz discovered neolithic sites in the western Transbaikalia.[3]

Farther to the east neolithic relics were discovered on the dunes of the banks of the River Patkha where it flows into the Amur.

Dr. Shirokogoroff[4] had found several neolithic deposits along the banks of the Amur River in its lower course, to the north and northeast. In the Amur Bay, Okhotsk Sea, neolithic sites and kitchen middens were discovered by Margaritoff and Yankovsky.[5]

SOME CHARACTERISTICS OF THE SIBERIAN NEOLITH

Some characteristics of the Siberian neolith which follow are based on Siberian authorities, chiefly the writings of Professor Petri.

The Siberian palæolithic stations, as we have seen before, are not numerous and are little studied as yet.[6] Finds belonging to the neolithic period in Siberia are much richer. While the upper palæolithic remains may be referred to the

[1] B. E. Petri, *Report on a Voyage to the Baikal Lake in the summer of 1916*, in Report of Russian Academy of Sciences for 1916 (in Russian).

—— *Neolithic Finds on the Baikal, A Preliminary Report on the Excavations of the Neolithic Station Ulan-Khad*, Memoir Museum for Anthropology and Ethnology, Russian Academy of Sciences, 1916, vol. 3 (in Russian).

—— *Deuxième voyage en Cisbaikalie au cours de L'été 1913*, Bull. publié par le Comité Russe de L'Association Internationale pour l'exploration historique, archéologique, linguistique et ethnographique de l'Asie Centrale et de l'Extrême Orient, Petrograd, 1914, Série II, No. 3, pp. 89–106).

The Neolithic Colony in the Pestchana Bay at the Baikal, University volume of the works of the Professors and Lecturers at the State's University in Irkutsk, 1921, part 2, pp. 56–65 (in Russian).

[2] P. P. Khoroshikh, *The Investigation of the Stone and Metal Ages of the Irkutsk Country*, Irkutsk, 1924 (The Island Olkhon) Bull. Biologic-Geographical Institute, University Irkutsk, 1924, vol. I, part 1 (in Russian).

[3] See J. D. Talko-Hryncewicz, *The Ancient Inhabitants of Asia*, Russian Anthropological Journal, Moscow, 1900, No. 2 (in Russian).

[4] S. M. Shirokogoroff, *Anthropology of Northern China*, Royal Asiatic Society, North China Branch. Extra vol. II, Shanghai, 1923, p. 8.

[5] V. Margaritoff, *Kitchen Refuse found on the Shore of the Amur*, Pub. by Society for Study of Amur Country, Vladivostok, 1889.

M. Yankovsky, *Kitchen Refuse and Stone Implements found on the Shore of the Amur Bay*, Bull. East-Siberian Division Russian Geographical Society, vol. XII, No. 2–3, pp. 92–93 (both in Russian).

[6] See above, p. 23.

close of the Pleistocene Period, the neolithic remains are found in recent geological layers. The conditions of life as concerns climate, flora and fauna are nearly the same as at present. The animals of the palæolithic period disappeared and the neolithic man of Siberia left the restless life of a nomadic hunter and became a settled fisher. All the neolithic sites were located on river banks or on the shores of vast water basins, and indeed all the reservoirs of central and southern Siberia have invariably preserved on their banks and shores remains of neolithic industry. It may be noted here that some places like the sandy ground of Ulan-Khad[1] did not appear favorable for the preservation of wooden and bone objects.

STONE INDUSTRY

The neolithic stone industry of Siberia may be characterized by the small size of its artifacts, particularly of arrow heads and scrapers. As is known, the mesolithic industry in western Europe is attributed to the so-called Azilian or the transitional epoch from the palæolithic to the neolithic period. On the other hand the neolithic artifacts of Siberia may be distinguished by a perfect and finished retouching. Many of the stone artifacts are made of flint, although this material is not abundant in Siberia. The Siberian neolithic workman had often to satisfy himself with inferior stone material, chiefly with quartzite.

The bow and arrow is the invention of neolithic culture. Unfortunately the bow and wooden arrow shafts have not been preserved. The most spread-out type of stone arrow points is of a triangular form with a somewhat grooved base for setting into the shaft. There are also points of lancet-leaf, willow-leaf types and of a more slender lancet-like form. Lance heads were as variable in form as arrow points, but of larger size. The same may be said of scrapers;[2] awls and drills were also of different types as to size, form and hafting. Knives were found from 2 cm. to 8 cm. in length. Some of them were serrated, serving also as saws.

Two kinds of stone fishing sinkers were found: grooved balls and natural flat pebbles with notches on two sides. Professor Petri sees in them the proof of use of the seine by the Siberian neolithics, but such stone sinkers might also be used for fishing hooks, as is the case with the Aleut[3] and Kamchadal. Besides there were found numerous stone hooks for fishing lines, consisting of two pins of mica-schist tied together like the compound bone fish-hooks of the Aleut and the California Indians.[4]

The Siberian neolithic man also manufactured some large stone implements, in the shape of slender chisels, wide gouges, bent gouges, axe-wedges and axes with ears. These implements were fastened to wooden handles by means of thongs or ropes made of vegetable fibers. The large stone implements were

[1] See above, p. 27.

[2] For a detailed classification of scrapers see Professor Petri's *The Neolithic Finds on the Shore of the Baikal Sea*, Memoirs Museum for Anthropology and Ethnography, Russian Academy of Sciences, 1916, vol. 3 (in Russian).

[3] W. Jochelson, *Archæological Investigations in the Aleutian Islands*, Pub. No. 367, Carnegie Inst. Wash., 1925, p. 66.

[4] G. G. Heye, *Certain Artifacts from San Miguel Island, California*, Indian Notes and Monographs, Museum American Indian, vol. 7, No. 4, New York, 1921, p. 84, fig. 10; and St. Bowers, *Fish-hooks from Southern California*, Science, Cambridge, Massachusetts, 1883, p. 575.

intended for work on wood and to dig canoes[1] out of tree trunks. Although no remains of neolithic boats have been discovered in Siberia as yet, as neolithic dug-outs were discovered in western Europe and European Russia we may conclude that the Siberian neolithic man used the same or similar means of navigation in the waters on the banks and shores of which he lived. Some of the large stone axes served as weapons in war and hunting.

The absence of perforated stone-axes, which were manufactured in the neolithic period in Western Europe and European Russia is particularly characteristic of the Siberian neolith. This fact is very difficult to explain, as the Siberian neolithic man was well acquainted with the art of drilling. It is true that while the western neolithic man used the so-called cylindrical drill, his Siberian companion made holes by the method of two conical holes coming together. But even this method could be used for the perforation of axes. Particularly interesting are beautifully polished axes made of nephrite[2] in the late neolithic period.

CERAMICS

The Siberian neolithic ceramics are marked by their elegant form and variable ornamentation, by which they advantageously distinguish themselves from the neolithic ceramics of European Russia. They consist of egg-shaped pots with a conical bottom. When put on the hearth they were supported by three stones which took the place of the present tripod. Pots with a flat bottom, which are characteristic of the iron period, are almost absent. In a neolithic station on the Baikal Lake Professor Petri found, however, two flat-bottomed pots. The walls of the Siberian neolithic pottery were thin and porous in order to accelerate boiling, while the flat-bottomed clay vessels of the metallic ages have thick and compact walls and are used for conservation of liquids and milk products and not for cooking. The large amount of the remains of pottery shows that the Siberian neolithic man was rather a settled dweller, as pottery requires a more sedentary mode of life on account of its fragility. The use of pottery is an effective check to nomadism. The manufacture of the Siberian neolithic pottery was evidently the privilege of the women, as decorative patterns produced by fingers show the small finger traces of women. The clay vessels had handles outside the upper rim, or perforations under the rim, which were intended to suspend the vessels over the fire.[3] As tempering ingredients, Professor Petri found quartz sand and gravel, but no other nonplastic materials. He contends also that cooking by means of hot stones put in wooden trays filled with water was not used by the Siberian neolithic man.[4] He does not mention inside handles like those of the primitive Aino-Kamchadal pottery.

[1] The traditions of Siberian tribes recorded by the author mention dug-out canoes and rafts as primitive means of navigation. The sea-going Siberian neolithic Chukchee and Koryak had skin boats.

[2] Nephrite was highly prized by the neolithic man of Europe as well as of Siberia. This mineral is found in many places of Siberia; possibly the neolithic manufacturer knew other sources of supply and there is no reason to suggest its importation from Europe, where it seems to be scarce and sources of supply little known. See G. G. MacCurdy, *Human Origins*, vol. II, p. 98.

[3] For cooking in wooden trays and pottery with handles inside, see later in chapter on pottery.

[4] See chapter on pottery.

BONE INDUSTRY

Artifacts made from bone and horn were found chiefly in graves. The remains of neolithic culture were located mostly in sandy sites or in the upper layers of loess-like deposits of black earth. Sand is rather a bad medium for preservation of bone, as are the upper layers of soil, which are easily influenced by atmospheric agents.

Of the artifacts discovered, bone daggers, harpoon heads, fishing hooks, chisels, awls, needles, spoons and scoring sticks may be named. Awls of different sizes were found. Bone needles were quite thin and had eyes,[1] and were kept in cases made of birds' leg bones. There was a rich collection of the neolithic bone industry from the banks of the Angara River. From other localities of Siberia only single specimens are known.

DWELLINGS OF THE NEOLITHIC PERIOD IN SIBERIA

Very few traces of neolithic dwellings were found in Siberia, and those discovered were of different shapes. On the shores of the Baikal Lake on the site called Ulan-Khad[2] circles of stones with openings toward the south were found. Evidently these are remains of conical tents which consisted of poles covered with strips of larch bark. The present Karagas and some Tungus divisions also put stones at the bottom of their tents in order to securely fasten the lower ends of the bark cover.[3] On the Angara River Professor Petri found remains of four-cornered earth huts with entrances toward the south. The pits were about 1 yard deep, 3 yards wide and 5 yards long.

Neolithic dwellings discovered by Slovtzov near Tyumen on the shores of the Antreyevsky Lake (see above, p. 26) consisted of earth huts which formed villages surrounded by walls and trenches.

The neolithic earth huts of Siberia represented pits of four-angular, oval or circular form, like some pits of the middle Neolithic Period of Western Europe. Some of the pit dwellings had boarded floors and seats. The hearth was located in the center of the dwelling under a square or round opening in the ceiling, for entrance, light and smoke outlet. Some of the earth huts also had side-entrances for certain seasons or the whole year.

SKELETAL REMAINS OF NEOLITHIC MAN IN SIBERIA

We have said before (p. 23) that no skeletal remains of the palæolithic man have been discovered in Siberia as yet. But this is not the case with the neolithic man, the remains of which are already known, from some places at least. Vitkovsky[4] discovered at the mouth of the Kitoi River, a tributary of the Angara, and Ovchinnikov, in the village Glaskovo near Irkutsk, neolithic graveyards

[1] It is of interest to note that bone needles of the ancient Aleut had no perforation; the thread was tied to a notch in the upper end of the needle. See *Archæological Investigations in the Aleutian Islands*, Carnegie Institution, Pub. No. 367, p. 91.

[2] B. E. Petri, *The Neolithic Colony in the Pestchanaya Bay by the Baikal Lake*, Irkutsk, 1921.

[3] The present Chukchee and Koryak use stones to fasten the lower ends of the skin cover of their tents tucked inside the tent.

[4] N. I. Vitkovsky, *An Account on Excavations of Graves of the Stone Age in the Province Irkutsk on the Left Bank of the Angara River, made in the Summer of 1881*, Bull. East-Siberian Division Russian Geograph. Society, vol. XIII, No. 1–2, p. 1–36. *Id, A Brief Account on the Excavation of a Grave of the Stone Age made in July 1880*, Bull. East-Siberian Division of the Russian Geograph. Society, vol. XI, No. 3–4, p. 1–12.

which were thoroughly excavated.[1] Sosnovsky found two neolithic graves near the village Rasputino on the Angara River.[2] Neolithic burials were discovered in the environs of Krasnoyarsk by I. T. Savenkov[3] and V. V. Peredolsky.[4] All these graves gave exceedingly interesting data, characterizing the primitive beliefs of the Siberian neolithic man.[5] Osteological remains have shown that there were probably several narrow-headed varieties in northern Asia in the neolithic period. They were more differentiated in the beginning of the metal age. The prehistoric dolichocephalic Chuds of southern Transbaikalia, the narrow-headed builders of the tumuli (kurgans) in southern Siberia, and the dolichocephalic kurgan builders of south Russia probably belonged to one stock, identified with the blue-eyed and blond Usuns or Wusuns and the Dinlins of the Chinese annals, with the Sacæ, the western Scythians, and with the Nordics of northern Europe. These are regarded as having been nomadic peoples, mostly pastoral.

Craniometric measurements of skulls of the kurgans, made by the Siberian anthropologist Gorostchenko, gave evidence of the existence of one physical type, a long head, which does not correspond to the type of the modern population of the region, whether Turk or Mongol.

The present Ainos and Yeniseians may be regarded as remnants of the dolichocephalic stock in Asia.

It must be pointed out here that the gap between the ancient peoples of Siberia and their modern successors has not yet been bridged. The Chinese annals of the second century B. C. mention the blond and blue-eyed Usuns to the north of Mongolia. But at that time there had been continual movement in Asia, and great changes seem to have taken place even in comparatively recent times. The Huns left China for the west at the end of the second century of our era. The Uigurs descended from the Altai in the seventh century; the Pechenyegs in the same century and the Polovtzy in the eleventh passed Central Asia to the west; about the same time the Kirghiz-Kaisak made their appearance from the Tyan-Shan Mountains. A part of these nomadic Turko-Mongolic invaders evidently diverted to the north and exterminated or assimilated the dolichocephalic aborigines of Siberia.

NEOLITHIC SITES IN COUNTRIES ADJACENT TO SIBERIA

The Lake Kosogol—Neolithic sites on the banks of the Kosogol Lake in Northern Mongolia were discovered by Professor Petri[6] in 1923. He identifies the Kosogol neolithic finds with those of the Baikal Region and regards them as belonging to one neolithic province. Specimens of both regions show similar characteristics: microlithic implements, perfection of technics in flint specimens and fragments of pottery decorated by impressions of textile fabrics.

[1] B. E. Petri, *The Siberian Neolith*, Irkutsk, 1926, p. 28.

[2] G. P. Sosnovsky, *Prehistoric Remains by the Village Rasputino on the Angara River*, Irkutsk, 1924, Pub. Irkutsk Scientific Museum.

[3] I. T. Savenkov, *To the Material concerning the Archæology of the Middle Course of the Yenisei*, Bull. East-Siberian Division, Russian Geographic Society, vol. XVII, No. 3–4, pp. 30–33.

[4] V. V. Peredolsky, *On the Yenisei River and its Tributaries*, Bull. East-Siberian Division, Russian Geographical Society, vol. XXXII, No. 3, pp. 210–214.

[5] B. E. Petri, *The Siberian Neolith*, Irkutsk, 1926, p. 33.

[6] B. Petri, *Antiquities of the Kosogol Lake, Mongolia*, Irkutsk, 1926 (in Russian).

The Inner Mongolia—As the elevated region of the Kosogol is too cold to be a place of permanent abode for neolithic man, Professor Petri assumes that he moved there from the interior of Mongolia for the summer season. This conjecture may be corroborated by the finds of neolithic specimens in the province Jokhol (Inner Mongolia, 116 longitude, 44 latitude) on the River Sira-Muren (a tributary of the Lao-Khe River) by the French explorers,[1] who discovered artifacts of palæolithic industry in Northern China.[2]

The Gobi Desert—Walter Granger and other members of the third Asiatic Expedition of the American Museum of Natural History found, in 1922–1923, traces of a neolithic culture in two or three places in the Gobi. Later (in 1925) another member of that expedition, the archæologist N. E. Nelson, found traces in Inner and Outer Mongolia of at least four successive culture stages. The third and fourth culture levels represent two closely related culture stages, respectively, of neolithic and mesolithic types. The uppermost is characterized by decorated pottery of the handmade order of rubbed or ground and partly polished stone implements and utensils and, above all, by chipped stone tools and weapons. The lower or mesolithic level resembles the neolithic in enough respects for us to say that it is organically related to it, i. e., is ancestral to it; yet it differs from the neolithic in exhibiting no pottery, no true polished stone implements and no arrow points. In place of these items it carries a vast number of small, slender, oblong, highly specialized flakes, the specific use of which is not entirely clear. Another distinguishing characteristic is the presence of drilled disk beads made of shells. Strange to say, they found scarcely a trace of bone or antler implements belonging to these two closely related cultures, Nelson regards the mentioned pre-neolithic culture level as equivalent to the Azilian culture of Europe. In another place Mr. Nelson says concerning his Gobi finds:[3]

"Some bits of flint and fragments of pottery from distant parts of the Gobi may indicate that the early man had been there, at least in late stone age times. Some 225 miles from Kalgan were found several cores and flakes of flint and also a number of bits of broken pottery, all unquestionably of neolithic date. Traces of stone artifacts were found as far as into the Altai region. No form of implements recognizable as early palæolithic type were discovered. We did not positively succeed in finding any palæolithic implements actually imbedded at some depth in formations of Pleistocene Age, but on the surface. It must suffice to say that during late pre-neolithic and neolithic time man lived and worked there. The artifacts remains imbedded in the sands show that the time was long enough for the culture to change from a phase strongly resembling the Azilian of Western Europe to one of out and out neolithic characteristics."

In his latest report Nelson says[4] of the Yangtze River region in Central China, that no decisive evidences were obtained of the life in that region of the stone age man, whether in caves or in open places. The results of the Central Asiatic Expedition show that prehistoric man played a very inconspicuous rôle in this territory, that he was not a cave dweller, nor a hunter, but a woodsman and agriculturist, and that he arrived upon the scene, probably by boat, at a time not long prior to

[1] E. Licent et P. Teilhard de Chardin, *Note sur deux instruments néolithique de Chine*, Anthropologie, 1925, vol. xxxv, No. 1–2, pp. 63–74.

[2] See above, p. 25.

[3] N. C. Nelson, *Notes on the Archæology of the Gobi*, American Anthropologist, Jan.–Mar. 1926, pp. 305–308; *Archæological Research in Asia*, Nat. Hist. Jour., American Museum Natural Hist., May–June, 1925, p. 314.

[4] N. C. Nelson, *The Dune Dwellers of the Gobi*, Natural History, May–June 1921, p. 241.

the introduction of the potter's wheel. They suggest, moreover, that palæolithic man, the true hunter, either never reached the heart of China, or else that the forbidding character of the environment kept him out of this particular region. Of these two alternatives the second is of course the only safe one to embrace for the present; for not until the reconnaissance has been carried farther west, well up into the Tibetan highlands, can we safely exclude palæolithic man from this corner of Central Asia.[1]

Eastern Mongolia, Manchuria, Korea, Japan and China—The Japanese archæologists, Dr. and Mrs. Torii, say as follows of the culture of the primitive population of Eastern Mongolia:

"We are induced to believe that the Tong-Hou[2] of Eastern Mongolia had no eolithic and palæolithic periods, that from the time of their arrival in those regions they knew only the neolithic period, a period which is here in Asia not so sharply cut off from the preceding palæolithic period as in Western Europe, and finally that those peoples came from somewhere else, likely from the Altai or Turkestan, bringing with them a civilization already advanced. It is difficult to say at what epoch they arrived, but at the time of the Emperor Hoang-Ti, more than 2000 B. C. they were already old dwellers."

From oldest neolithic times the ancient population of Eastern Mongolia were making pottery;[3] at first of a very rough make, it gradually reached perfection.[4]

According to Dr. and Mrs. Torii, Manchuria, Korea, Japan and even China seem to have no palæolithic remains.[5] In Asia the polished stone age seems to be less clearly separated from the older age of dressed stone than it is in Europe, according to Professor Boule.[6] But all these countries are rich in prehistoric relics, ranging from the stone age to the iron age. The seaboard of Manchuria (Port Arthur), of Amur and of Japan have many shellmounds and kitchen middens similar to those of Denmark. Sometimes raised high above the present sea-level they contain neolithic implements of a special character. These countries, as well as Korea, are dotted with many megalithic monuments. The Chinese prehistoric period is still almost unknown; but we are aware that it includes a neolithic phase.

Dr. J. G. Anderson, mining adviser to the Chinese Government, has made numerous exceedingly important discoveries in both caves and open sites, of what he considers a late neolithic industry, called by him the Yang-Shao Culture, after his first type station in Honan. Anderson is, however, very cautious in his statements. He says:[7]

"So far no undoubted evidence of palæolithic man has been discovered in northern China. Also undoubted neolithic man can hardly be said to have been proved to occur in these regions. But we have traced the distribution in northern China of early culture, which during our excavations has so far yielded no metal objects and which as a whole must be said to be of late neolithic type."

[1] N. C. Nelson, *Prehistoric Man of Central China*, Natural History; Journal American Museum Natural History, vol. XXVI, Nov.–Dec., No. 6, 1926, pp. 570–579.

[2] According to the interpretations of Mr. and Mrs. Torii based on Chinese annals, the Tong-Hou were the aborigines of Eastern Mongolia at present extinct or at least transformed by mixture. Numerous remains of this original race were found by the above-named explorers.

[3] R. Torii et Kimiko Torii, *Étude archeologique et éthnologique; Populations Primitives de la Mongolie Orientale*, p. 87.

[4] *Ibid.*, p. 92.

[5] R. Torii, and Torii Kimiko, *Étude archeologique et éthnologique*, Jour. College Science, vol. XXXVI, Tokyo, 1914.

[6] M. Boule, *Fossil Men*, p. 355.

[7] See J. G. Anderson, *An Early Chinese Culture*, Bull. Geological Survey of China, No. 5, Part 1, October 1923, pp. 1–68.

Absolutely no trace of palæolithic man in Japan has appeared and it is altogether likely, says Dr. Bishop,[1] that the islands, together with eastern Asia generally, remained unpeopled until geologically very recent times. Torii discovered numerous neolithic sites on the Kurilian Islands, Shumushu and Paramushir. The most ancient sites are purely neolithic and bear Ainos characteristics, and may go back from 3,000 to 4,000 years B. C. They are generally located on well-selected places.[2]

The first wave of Tungus invaders, from 2,000 to 1,000 years B. C., were also neolithic, and even the second wave of the Mongoloids coming from the continent between the seventh and sixth centuries B. C. were neolithics.

In Manchuria, Dr. Torii[3] has made extensive neolithic discoveries. The excavations of Pumpelly[4] and his associates in Turkestan revealed that the deepest archæological remains discovered there belonged to the neolithic period. They are characterized by handmade pottery, polished stone implements and by the absence of copper. These sites are called Anau 1 by Pumpelly. No palæolithic sites are reported by the members of the Turkestan Expedition.

A WARMER CLIMATE IN SIBERIA DURING THE NEOLITHIC PERIOD

We have seen before how far to the north of Siberia pottery and other artifacts of neolithic culture were manufactured by the neolithic man of Siberia. At present the northern tundras of Siberia are inhabited by peoples (Ostyak, Samoyeds and others) who were forced out from the south by newcomers from Central Asia, and who, as it is contended, regressed in their culture under the unfavorable conditions of life in the Arctic region. But there remains a question, who were responsible for the remains of neolithic culture in the far north—the ancestors of the present inhabitants or some other peoples?[5] This question may be solved in the future by extensive excavations, but we must admit that during the neolithic period northern Siberia was favored by a much milder climate than at present. This belief may be corroborated by the investigations of V. N. Sukachev of the turfs of the Karsky tundra (between the River Stchuchya and the Kara Sea). He discovered remains of firs, pines, larches, birches and alders there, where now the treeless tundra extends, and he suggests that formerly it was much warmer at that latitude. He refers this period to the time following the retreat of the last glaciation.[6]

[1] Carl Whitting Bishop, *The Historical Geography of early Japan*, From Report for 1925, p. 548, Smithsonian Institution, Washington, 1926.

[2] R. Torii, *Études archéologiques et éthnologique: Les Ainou des Iles Kouriles*, Journal College of Science Tokyo Imperial University, vol. XLII, Art. 1, pp. 189–190, Tokyo, 1919–1921.

[3] *Ibid*, p. 318.

[4] Raphael Pumpelly, *Explorations in Turkestan: Prehistoric Civilization of Anau*, Vols. I–II, Pub. No. 26, Carnegie Inst. Wash., 1908.

[5] It must be added that the Obdorsk pottery resembles on one hand the prehistoric pottery of the Ladoga Lake in the north of European Russia, on the other the ceramics found in the Baikal Lake region. But whether this may be regarded as a result of borrowing, convergent development or migration of the makers remains for the future to decide.

[6] See *Meteorological Messenger*, 1922, pp. 25–43 (in Russian).

A warmer climate is also suggested by the zoologist, A. A. Byalynitzky-Birula, for the Angara country in the transitional time from the late Magdalenian to the Gschnitz period, according to remains of Arctic animals which disappeared in that period.[1]

[1] See B. E. Petri, *The Siberian Neolith*, p. 38 (in Russian).

CHAPTER V

METALS IN THE PREHISTORIC KAMCHATKA

In the beginning of the seventeenth century the Japanese Government prohibited all navigation beyond its home waters, and before the Russians conquered Kamchatka the Kamchadal were not acquainted with the use of metals. However, there is no doubt that some iron instruments and other Japanese goods had reached Kamchatka through the Kurilians, even before the Russian invasion. Mr. Torii says that the Japanese never traded directly with Kamchatka, as contended by Bogoras.[1] The Japanese, according to Torii, exchanged their goods with the Ainos of Yezo. The latter sold them to their Kurilian kin at the regular fairs on the Island Rasava, and the Kurilians delivered them to the Kamchadal and the Kamchadal brought them to the Koryak and Chukchee. Thus the Kamchadal got from the Kurilians swords, needles, iron pans, cotton stuff, dresses made of bark fiber, armors, plumb and silver earrings, belts with silver buckles, in exchange for fur-skins, before the Russians introduced metallic objects to them. In the excavations in many pits on the shores of the Kuril Lake, I found brass coins of the eleventh century, according to the decision of Professor Koganei, to whom I showed the coins. As the coins were only of one period we may draw the conclusion that at that period the Japanese trade with Kamchatka, through the Aino-Kurilian intermediary, was quite extensive.[2] The old Japanese coins had a hole in the center and it might be that Kamchadal women wore them as ornaments.

However, these trivial borrowings from the Japanese culture were quite insignificant and scanty and the real transition from the neolithic period to a metallic stage had taken place under the influence of the Russians, who brought to Kamchatka iron, copper, bronze and silver instruments, vessels and ornaments.

It was not so in central and western Siberia. There the Russians found old seats of metallic production. As the Russian invaders were chiefly warriors and not artisans they had to have recourse in their needs to native metal workers and iron smelters.

METALS IN SIBERIA

Siberia, as we have said, was acquainted with the use and manufacture of metallic objects, reduction of metals from their ores and making alloys before the Russian conquest. But the historical development of metallurgy in some places of Siberia was different from that of Europe.

[1] See Waldemar Bogoras, *The Chukchee*, p. 54.

[2] According to Krasheninnikoff (vol. II, p. 49, in Russian) the Kamchadal called a needle "shish" and the Japanese as procurers of needles "shishaman."

TRANSITION FROM THE NEOLITHIC PERIOD TO THE AGE OF METALS IN SIBERIA

The first attempts to put the bronze age in Europe before the iron age were made by Danish scholars. Later Swedish and French archæologists classified the European bronze age into three and five epochs, respectively. The bronze industry of Siberia is represented by two main prehistoric seats, those of the country of Minusinsk and the locality of the Transbaikalia Steppes, and by several sites to the west of the Minusinsk region, investigated by Professor Radloff.

Radloff, basing his knowledge on his excavations of stone graves and burial mounds of the bronze and iron ages in the west Siberian steppes and river valleys, pictures these two epochs in the following manner.

Old stone graves in the Yenisei Valley and Altai country and ancient burial mounds in the steppes furnished in abundance copper and bronze implements, kettles, ornaments and objects of art along with some stone implements, and therefore we may be justified in concluding that the use of iron was still unknown to the producers of those remains. The bronze workers may have been a settled people. Among the bronze objects parts of horse harness were very seldom found. They were hunters, but there is no proof of their having been cattle breeders. Professor Radloff contends that the representatives of the Siberian bronze epoch were the so-called Yeniseians, later Turkeyized, and not the forefathers of the Ugrian-Samoyeds, who formerly lived in the Altai-Sayan regions. There is no proof, says Radloff, that the present Ugrian-Samoyeds reached a higher stage of culture in their original abode than they do at present. They were from the beginning nomadic reindeer breeders.

Those Yeniseian bronze manufacturers later learned the art of iron industry from the Tu-kiu, i. e., Turks, who were nomadic horsemen, troublesome and warlike, but who pursued, however, agriculture near their winter quarters (see Dr. Wilhelm Radloff, *Aus Sibirien*, Leipzig, 1893, vol. II, pp. 78–109, 116–143).

As to the regions of Minusinsk and Transbaikalian Steppes, both the late Professor Radloff and Professor Petri[1] regarded these two hearths of bronze as imported from the south by nomadic cattle breeders. Nomadism and cattle breeding are regarded as indispensable attributes of the Siberian Bronze Culture, and thus the bronze industry lastingly established itself in the two mentioned cattle-breeding localities. While these two bronze manufacturing centers were developing, the forest border to the north of them served as a check to the spreading of cattle breeding and bronze industry. The neolithic period still continued to keep ground in the woods.

In speaking of the bronze culture seat of Minusinsk, at least two names of investigators of Minusinsk antiquities may be mentioned—D. A. Klementz[2] and A. M. Tallgren.[3] Klementz, while being a political exile in Minusinsk, was the first to compose a systematic catalogue of the collections of the metal age of the

[1] W. W. Radloff, *The Siberian Antiquities*, vol. I, parts 1–3, vol. II, part I; *Materials for the Archæology of Russia*, Pub. Archaeological Commission, 1888.
B. E. Petri, *The Siberian Neolith*, Irkutsk, 1926, p. 34 (both in Russian).

[2] D. A. Klementz, *The Antiquities of the Minusinsk Museum: Remains of the Metalic Epochs*, Tomsk, 1886 (in Russian).

[3] A. M. Tallgren, *Chapitres d'Archéologie Sibérienne: Collection Tovostine des Antiquités Préhistoriques de Minusinsk conservées ches le Dr. Karl Hedman a Vasa*, Societé Finlandaise d'Archéologie, Helsingfors, 1917.

Minusinsk Museum. Tallgren was not satisfied with the somewhat schematic description of Klementz. He gives an accurate account of a collection of 1,053 archæological specimens collected in the region of Minusinsk by the Russian collector Tovostine, and tries to connect this region historically and chronologically with surrounding cultural provinces. He is inclined to regard the bronze and copper socketed celts of the bronze period of central Siberia as due to European, particularly Hungarian, influence.

According to Dr. Laufer's suggestion the Minusinsk bronze province may be regarded as a connecting link between the Scythian area of Southern Russia and the culture of ancient China.

Professor Rostovtzeff, the well-known authority in classical archæology, is more explicit in the interpretation of the artistic and historic connections of the Minusinsk bronze culture to that of the Scythians and China. Professor Rostovtzeff[1] suggests that the motives of the Scythian animal style had their origin in Assyria. The theory, which accounts for the genesis of the Scythian animal style, places its origin in a country which roughly corresponds to modern Turkestan, but which comprises also the mountain region of Altai, rich in metals. Here an Iranian people, the Sacians, in constant intercourse with Assyria, founded the animal style which they afterward brought with them to South Russia.

The Assyrian elements reached Siberia indirectly through another medium, and were distorted before they arrived. The Minusinsk style of bronze manufacture, although by no means primitive and bearing marks of Assyrian influence, shows no signs of evolution; it remains almost stationary and is much poorer in motives than the Scythian animal style. The Siberian style is very awkward, clumsy and crude. It is a decadent and derivative style.

There is no direct connection between the Minusinsk bronze culture and that of China. The Chinese themselves were influenced in their art, as well as in their military training, burial customs and beliefs, by the Iranian tribes of Sarmatians and Alans, who were akin to the Scythians and who took part in the Hunnish assaults upon China.

DIRECT TRANSITION OF NEOLITHIC CULTURE INTO THE IRON AGE IN SOME PARTS OF SIBERIA

There is reason to believe that the late neolithic period of the middle, forested part of Siberia went over immediately into the iron age without having passed through the bronze age. To the north of the Baikal Lake, Russian archæologists (Petri, Ovchinnikov, Ostrovskikh and others) have discovered many sites of prehistoric iron manufacturers with remains of the late neolithic period. Remains of iron foundries and forgeries were discovered, along with stone artifacts of the late neolithic times. According to their form and mode of manufacture, single specimens of bronze found here and there came evidently by the way of exchange or raids from Minusinsk or Transbaikalia.

In the history of material culture we know other cases of such direct succession of the stone age into that of iron.

[1] See *Iranians and Greeks in South Russia* by M. Rostovtzeff, Hon. D. Litt, Professor, University of Wisconsin, Member Russian Academy of Sciences, Oxford, 1922, pp. 197–202.

The late Professor von Lushan[1] contended that Africa was not only the place of origin of iron technics, but that the negroes knew the art of smelting iron before they began the manufacture of bronze. Professor G. G. MacCurdy[2] also admits, concerning Africa, that south of Sahara there was no bronze age properly so-called, the iron age immediately succeeding the neolithic period.

Iron was the first metal to be utilized by the Eskimo, who fashioned knives from masses of telluric iron in Ovifak, Greenland, according to Nordenskiold.

There is little or no evidence of a bronze age in Japan, says Chamberlain.[3] Mr. and Mrs. Torii maintain that the Tong-Hou, the ancient inhabitants of Eastern Mongolia, knew the neolithic age, and the iron age followed it without any period of transition.[4]

The Tong-Hou did not manufacture bronze. Objects of bronze found here and there are undoubtedly of Chinese make and importation. The same may be said, according to these explorers, of Manchuria and Korea. Mr. Torii[5] found in southern Manchuria sites on which neolithic artifacts were mixed with iron objects, and he contends that the neolithic man of South Manchuria got iron from Korea. Along with iron-objects were found some bronze implements and ornaments, but these objects were certainly of Chinese manufacture and importation. The primitive dwellers of Eastern Mongolia were not bronze workers. This region knew the stone age and the iron age without any transitional age of bronze.

R. Torii[6] says that the Manchus, like the oriental Mongols, directly passed from the age of stone to the age of iron without having passed through the age of bronze.

The successors of the Tong-Hou, the Wouhwang and the Siem-Pi,[7] according to the Chinese historians were iron-workers at the end of neolithic times. This is shown by finds of iron slags along with neolithic artifacts (and this may be said also concerning Korea and Manchuria). The map (fig. 1) demonstrates the palæolithic, neolithic bronze and iron stations of Siberia as far as they are known at present. From this map can be seen how little archæological investigation has been made in Siberia until now. Most places still form a *tabula rasa*, and it remains an open question whether the conclusions I have made will be corroborated in the future or not.

The same may be said of the above quoted authorities concerning Japan, Korea, Manchuria, Mongolia, China and other places. We regard these quotations as an enumeration of statements of up-to-date investigators, which may be confirmed or confuted by future excavations.

[1] Felix von Lushan, *Eisentechnik in Afrika*, Zeitschrift für Ethnologie, Band 41, Berlin, 1909; also in Völker, Rassen, Sprachen, Berlin, 1922, p. 5.

[2] George Grant MacCurdy, *Human Origins*, New York and London, 1924, vol. II, p. 181.

[3] Basil Hall Chamberlain, *Things Japanese*, London, 1905, p. 29.

[4] R. Torii and Kimiko Torii, *Études Archéologiques et Ethnologiques: Populations Primitives de la Mongolia Orientale*, Jour. College of Science, Tokyo Imperial University, vol. XXXVI, 1913–1915, p. 97.

[5] R. Torii, *Études Archéologiques et Ethnologiques: Populations préhistoriques de la Mandchourie Méridional*, Jour. Coll. Science, Tokyo Imperial University, vol. XXXVI, 1913–1915, p. 42.

[6] R. Torii, *Études Archéologiques et Ethnologiques. Populations préhistoriques de la Mandchourie Méridional*, Jour. College of Science, Tokyo Imperial University, vol. XXXVI, Art. 8).

[7] The Siem-Pi are regarded of Mongolian (Tungusic) origin (see Kean, *Man Past and Present*, 1920, p. 291), while the Tong-Hou may have been descendants of Caucasic peoples.

NORTH ASIA

0 100 300 500 MILES
0 100 300 500 KILOMETERS

⊥ *Palæolithic stations*
× *Neolithic* "
▲ *Bronze* "
● *Iron* "

Distribution of Palæolithic, Neolithic, Bronze and Iron Stations of Siberia

CHAPTER VI

ARCHÆOLOGICAL REMAINS FROM THE KAMCHATKA EXCAVATIONS

SOURCE MATERIAL FOR STONE IMPLEMENTS

The following is a list of minerals of which the Kamchadal manufactured their stone implements and weapons. The minerals are given in the order of their diminishing hardness:

1 Flint
2 Hornstone schist
3 Quartz schist
4 Quartzite
5 Jasper (variety of quartz)
6 Chalcedony (agate)
7 Andesite
8 Obsidian, andesitic
9 Augite, andesitic
10 Porphyrite
11 Sandstone
12 Quartz slate
13 Marble
14 Slate
15 Red ocher
16 Volcanic tuff
17 White clay

While on the Aleutian Islands[1] no flint implements were found, a considerable number of arrow heads and other implements excavated by the author in Kamchatka were made of flint, according to the determination of a mineralogist, Professor A. G. Titov of the University of Moscow. The Aleut used andesite, instead of flint, most frequently for stone implements; the Kamchadal very seldom used this material, preferring the massive varieties of quartz and, partly, obsidian.

Soapstone, of which the Eskimo manufacture their lamps, is not met in Kamchatka and the Kamchadal use harder minerals for lamps, as will be seen later.

LOCALITIES WHERE EXCAVATIONS WERE MADE

The present writer made excavations in the following places:

(1) On the shore of Salt Lake on the isthmus in the Avacha Bay, August 19, 1910.
(2) In the Bogatyrevskaya Bay, above Salt Lake, in the forest, August 20, 1910.
(3) Cup-like holes were excavated not far from Salt Lake in afternoon of the same day.
(4) On the slope of the hill on the northeastern side of the Bogatyrevskaya Bay, August 21, 1910.
(5) In the village Syeroglaska, 10 miles from Petropavlovsk, August 25, 1910.
(6) In the village Savoiko, August 29–30, 1910. Savoiko is located on the left bank of the Avacha River, 16 miles from its mouth. Formerly it was called Stary Ostrog and renamed Savoiko after the Governor of Kamchatka (1850–1855), the senior captain and later admiral, V. S. Savoiko.

For numbers 1 to 6, see map of the Avacha Bay (p. 42).

(7) On the bank of the Nalacheva River, September 19.
(8) On the shores of the Nalacheva Lake, September 20 to 24, 1910.
(9) On the Nalacheva Cape, September 26–30, 1910.
(10) Ancient site on the mouth of Kulki River, emptying itself into the Tighil River, 4.6 miles from its mouth, June 10, 1911.
(11) Ancient site on the mouth of Kavran River, June 27 to July 6, 1911.
(12) On the bank of Osernaya River, 2 miles from Kuril Lake, August 6, 1911.
(13) On the Siwusk Cape in Lake Kuril from August 9 to August 14, 1911.

[1] W. Jochelson, *Archæological Investigations in the Aleutian Islands*, p. 56.

Of the above localities, Numbers 1 to 12 yielded the following sites:

SITE 1

On a hill above Salt Lake there were several pits, which could not be noticed at first sight as they were covered with an abundant overgrowth of the shelamainik (*Filipendula kamtschatica* Max.) and horse-tails (*Equisetum heleocharis* Ehrh.) 6 feet high. The staple food of the old Kamchadal fishers consisted of different salmon species, the bones of which in decaying formed an excellent fertilizer for the soil. In my work on the Aleutian archæology I pointed out that no bones of salmon were found in excavations of ancient village sites on the Aleutian Islands, contrary to the statements of Dr. Dall for the Aleutian Islands and Professor Emile Rivière, cited by Professor MacCurdy, concerning finds in a cave near

1. Salt Lake.
2. Bogatyrevskaya Bay.
3. Isthmus above the Salt Lake.
4. Slope of hill on the northeastern side of Bogatyrevskaya Bay.

2

Menton, France.[1] In his *Human Origin*, Professor MacCurdy[2] cites Mr. Abbo as having found on a skeleton excavated in Verneau, France, perforated salmon vertebræ, evidently worn as ornaments. It would be interesting to determine whether the vertebræ were really of salmon, and not of some other species of fish. As I have stated, the soft bones of *Salmonoidea*, which ascend rivers and fresh-water lakes for spawning, decay rapidly, falling to pieces in 2 or 3 years.

Professor R. Torii[3] referring to remains of food found in his archæological excavations in Manchuria tells of fish bones, the species of which could not be determined because they were only a heap of powder. These were undoubtedly salmon bones.

[1] Waldemar Jochelson, *Archæological Investigations in Aleutian Islands*, p. 138; W. H. Dall, *On Succession in the Shell Heaps of the Aleutian Islands*, Contributions to North American Ethnology, vol. I, Washington, 1877, pp. 41–91; G. G. MacCurdy, *The Field of Paleolithic Art*, American Anthropologist, vol. 26, No. 1, Jan.–Mar., 1924, p. 41.

[2] George Grant MacCurdy, *Human Origins*, vol. I, p. 392.

[3] R. Torii, *Populations Préhistoriques de la Mandchourie Méridionale*, Jour. College of Science, Tokyo Imperial University, 1913–1915, vol. XXXVI, Art. 8, p. 48.

As it was not an easy piece of work to cut away the heavy stalks of the coarse vegetation, we excavated only one pit, in which but few specimens were found. The hill was 9 feet high over the lake. The pit, after the vegetation was cleared, was 5 feet deep. Then followed a 3-foot layer of dark mold and a layer of yellow clay without any trace of cultural remains. No unperishable remains of building material were found. Specimens found in the mold layer were:

(1) A piece of rude pottery (2157).[1]
(2) A stone implement, not finished (2158).
(3) A stone hammer (2159).

SITE 2

There were 4 pits over the lake. The layer of mold was very thin and yielded only two specimens:

(1) A fragment of a stone lamp (2160), very primitive.
(2) An obsidian arrow point, not finished (2161).

SITE 3

Not far from the lake, right over the sea, about 3 feet high were many circular shallow pits on the flat gravel in which no cultural remains were found. My Kamchadal laborers could not explain the origin of these pits. They are probably traces of round tents of a military camp of the European allies who landed in Kamchatka during the Crimean war.

SITE 4

There were several pits with remains of burnt wood and stones in the dark soil, to the depth of 3 feet, but no other refuse. A yellow sand formed the base of the pit.

SITE 5

A pit was excavated to the depth of 4.5 feet. A layer of 3 feet contained cultural remains. There were found charcoal, burnt stones, bones of seals and shells of mollusks (*Katharina tunicata* Wood and *Modiola modiolus* L.) and the following specimens:

(1) A flint arrow point (2162).
(2) A polished marble object resembling a labret (2163), but it must be noted that no labrets were used as personal ornamentations by the ancient Kamchadal.
(3) A stone ax.

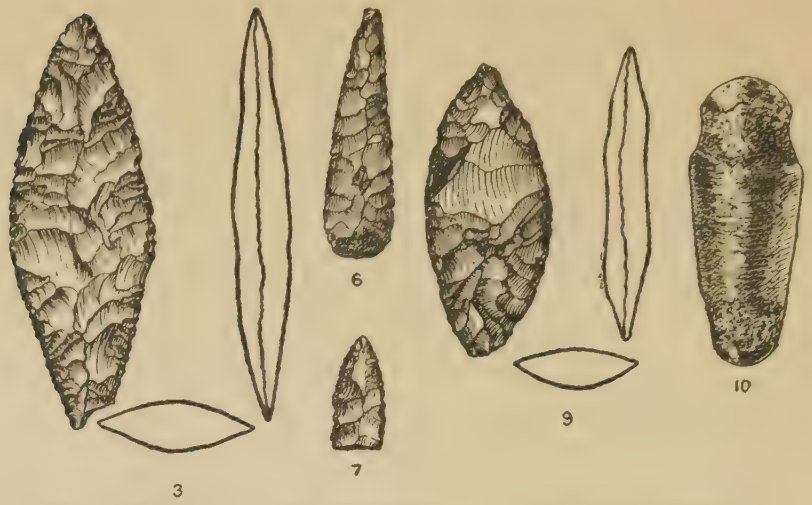
SITE 6

Two pits were excavated near the village Savoiko.

Pit A: The depth before digging was 3 feet 8 inches and a shaft was cut 5 feet 2 inches deep. The layers were as follows:

(1) Yellow sand covered with grass, 1 foot high.
(2) Volcanic ash, 5 inches deep.
(3) Fine gravel, 1 to 2 inches.
(4) Dark-brown sand with roots of plants, 2 feet 7 inches.
(5) Black soil with organic remains, 2 inches.
(6) Brown sand, 1 inch.

[1] The catalogue number is shown in parenthesis.



3. Laurel leaf-like blade of dark grayish flint.
6. Arrow blade of green jasper.
7. Arrow flint blade.
9. Blade of black obsidian.
10. Stone pestle of quartz slate.

All of Nalacheva Lake.

Pit B: Length, 24.7 feet; width, 22.2 feet. The entrance was directed to the east. We excavated 6 feet 7 inches deep until a single layer appeared. Separate layers were:

(1) Organic remains and roots of plants, 2 feet.
(2) Gray sand and volcanic ash, 2 feet 6 inches.
(3) Yellow sand, 2 feet 1 inch.

Pits A and B yielded the following finds: 1 stone ax (2165); 1 obsidian arrow or harpoon point (2166); a piece of pottery (2167); a laurel leaf-like blade of dark greyish flint with fine trimming on both sides. Length, 91 mm.; greatest width, 32 mm.; thickness, 11 mm. (see fig. 3, 2168); a stone arrow not finished; and two stone hammers (2170 and 2171).

4

Pit No. 1, Nalacheva Lake.

SITE 7

My party left Petropavlovsk on horseback on September 13 at 12.30 afternoon and reached the village Khalakhtyrka at 6 in the evening. The route lay through a low ridge and by the shore of the Khalakhtyrka Lake. The last 1.3 miles we moved along the Khalakhtyrka River, a most picturesque country. We passed the night in Khalakhtyrka village. A stone celt found while building a

blockhouse was given to me (2209). We left Khalakhtyrka in the morning of September 14. We, and our laborers, had to walk, as I could get only four pack horses for our freight, and the horses and drivers from Petropavlovsk had to return to that place. When it became dark we put up our tents and stopped for the night, only 1.3 miles from the Nalacheva River.

In the morning of September 15 we left our camp, and about 3 o'clock in the afternoon crossed the river in two small boats. Usually one boat is left on each bank for the use of travelers. You cross the river in the boat, taking a part of your freight with you, and coming back with two boats you carry over the remaining freight and passengers. There are also some planks leaning on trees, by which you can bridge the two boats in order to take over heavy freight or to cross more safely. The river is quite wide and has a strong current. The horses, freed from their pack or riding saddles, are driven into the river and forced to swim across. After crossing the river the travelers have to return both boats to their proper places.

On September 16 we passed the sites on the Nalacheva River and between the river and Nalacheva Lake. September 17 to 19 we excavated two sites on the Nalacheva River, one 6 feet 2 inches deep, the other 4 feet 7 inches deep. In none of them were artifacts found, except burned stones in the center—traces of former hearths.

On the shores of the Nalacheva Lake excavations were made on September 20 to 24, 1910. Traces of pit-dwellings[1] were discovered all around the lake, showing that the place had been densely populated.

Pit No 1 was 3 feet 10 inches before digging (fig. 4). The hearth, 1 foot deep after digging, was opposite the entrance passage. In the corners of the northeastern side burned wood was found instead of posts. On the west, in a hole 2 feet deep, a rotten post, the lower end of which had been partly preserved, was still standing. The entrance passage was 10 inches deep before digging. The pit was covered with the grass of meadow-sweet (*Filipendula kamtschatica* Max.), spear-grass (*Calamagrostis langsdorfii* Trin.) and *Pleurospernum kamtschaticum* Hoffm. of the Umbelliferæ.

The distances between the inner posts were 6 feet and 7 feet 2 inches. The following artifacts were found:

(1) A fragment of an obsidian arrow point, not finished (2194).
(2) A stone arrow point (2194).
(3) A stone arrow point, not finished (2195).
(4) Five fragments of pottery.

5

Pit No. 2 (fig. 5) was 16 by 15 feet. The length of the entrance passage was 8 feet. Before digging the depression was 4 feet, and the pit was excavated to a

[1] The sketches of the depressions, the outward evidences of ancient underground dwellings, are given in a somewhat irregular form, as they were drawn by the writer in the field. The irregular configuration of the cavities may be explained by the falling in of parts of the earthen walls.

depth of 1.5 feet only. Yellow sand without cultural remains followed. The following artifacts were discovered:

(1) Fig. 6 (2206). An arrow blade of dark green jasper, with a rounded base, well finished, the point being broken off. Length, 55 mm.; greatest width, 15 mm.; greatest thickness, 11 mm.
(2) Fig. 7 (2207). A fragment of a small obsidian point, similar to an Aleut surgical lancet.[1]
(3) A fragment of the lower part of an obsidian arrow point (2208).
(4) A stone celt (2210).
(5) A piece of pumice for polishing stone implements (2211).
(6) Fragments of two clay pots.
(7) In the entrance passage a piece of pottery with an inside ear was found.

In the morning of September 21, 1910, the temperature was 3° C.; in the afternoon snow was falling.

Pit No. 3, Nalacheva Lake. Pit No. 4, Nalacheva Lake.

Pit No. 3 was 2 feet 5 inches deep before digging, and was excavated to the depth of 4 feet. The following artifacts were discovered in this pit (fig. 8):

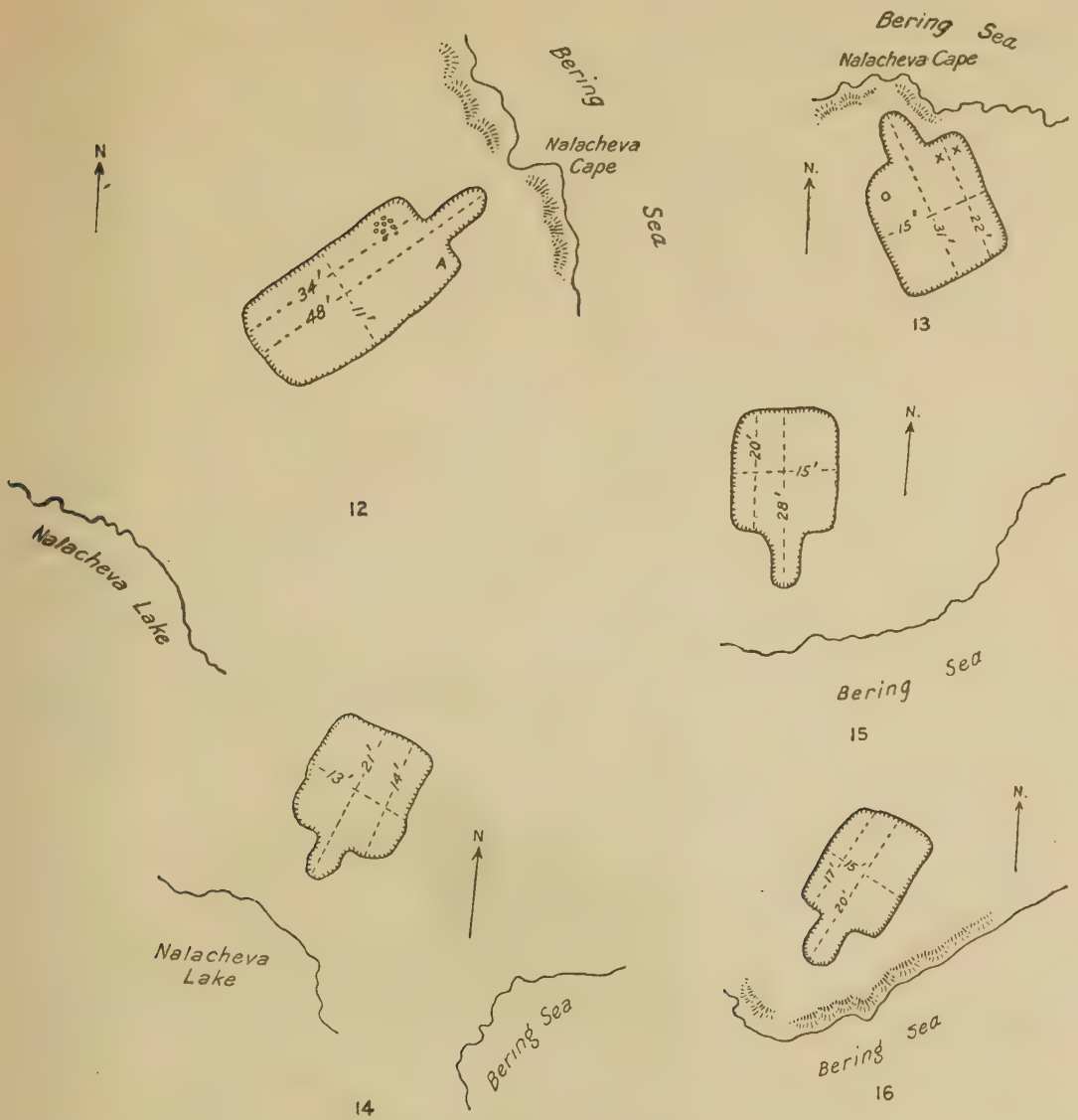
(1) An arrow point of rock crystal (2192).
(2) A fragment of a stone celt (2191).
(3) A stone celt (2205).
(4) A stone arrow point (2197).
(5) An obsidian arrow point in the form of a laurel-leaf, black with red veins. Length, 64 mm.; greatest width, 27.5 mm.; greatest thickness, 9 mm. Illustrated in fig. 9 (2198).
(6) A whetsone for grinding and polishing (2199).
(7) A stone chisel (2200).
(8) Fig. 10 (2201). A polished cylindrical pestle of grayish quartz slate for grinding paints or possibly food, made of edible plants mixed with animal fat or oil. Near both ends of the implement traces of pecking with a hammerstone may be seen, perhaps for making grooves. Length, 62 mm.; greatest diameter, about 23 mm.

Before digging, Pit No. 4 was 4 feet deep, and it was excavated to the depth of 7.5 feet (fig. 11). Artifacts discovered were:

(1) A stone celt (2202).
(2) A piece of rock crystal with traces of an arrow point (2203) having been manufactured from it.
(3) A small obsidian arrow point (2204).

At Site 9, on the Nalacheva Cape, diggings were made on September 26 to 30, 1910.

[1] W. Jochelson, *Archæological Investigations in the Aleutian Islands*, p. 60, fig. 16.



Figs. 12 to 16, showing Pits 1 to 5 on Nalacheva Cape.

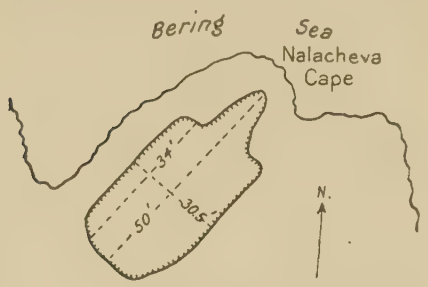
Pit No. 1 before digging was 2 feet 6 inches deep and was excavated to the depth of 3.5 feet. In the right corner from the entrance there were found hearth stones and on them were some shells of the mollusk *Mytilus edulis* L.; a broken clay pot was also found. The following artifacts were discovered in this pit:

(1) A flat obsidian arrow point (2178).
(2) A fragment of such a point (2179).
(3) A small obsidian arrow point (2180).
(4) A piece of obsidian in process of arrow making (2181).

Before digging, pit No. 2 was 2 feet 4 inches deep and the excavation was carried to the depth of 4 feet. X (fig. 13) shows the place where a complete clay pot with

handles inside was found; O, where fragments of another pot were found. The diameter of the rim of the complete pot was 1 foot 6.25 inches, of the bottom 11 inches, and the height of the pot was 8 inches. The pot was discovered at a depth of 3 feet 4 inches. The pit before digging was covered with *Empetrum nigrum* L., *Epilobium angustifolium* L., bushes of the wild rose (*Rosa acicularis* Lindle), the fern (*Cryptogramme acrostichoides* R. Br.) and other plants, and it took much time to clean the pit before digging. The following stone artifacts were found:

(1) Two rudely made arrow points of quartz (2172).
(2) Four obsidian arrow points.



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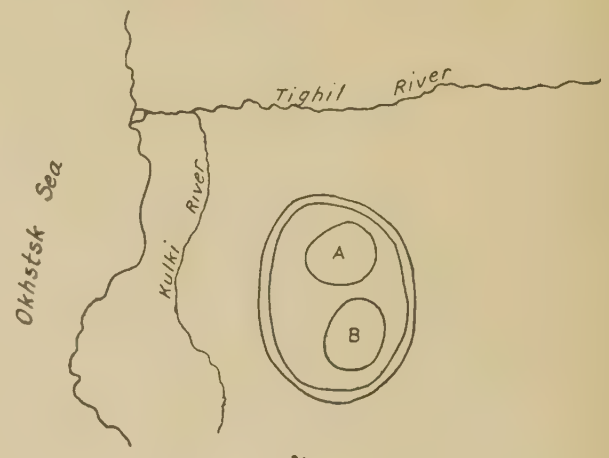

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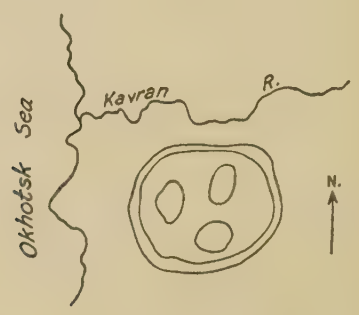

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17. Pit No. 6, Nalacheva Cape.
20. Sketch of Nalacheva Lake and Cape.
21. Sketch of ancient site of Kulki River.
23. Sketch of ancient site of Kavran River.

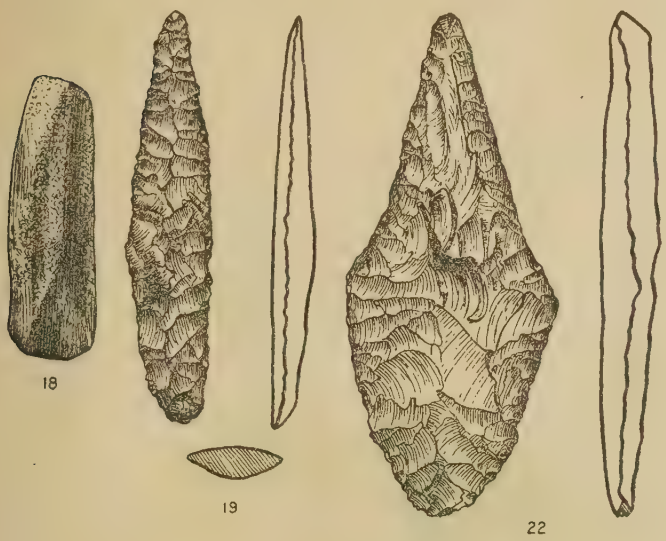
The depth of Pit No. 4 before digging was 2 feet 4 inches and it was excavated to the depth of 3.5 feet. Only two obsidian arrow points were found (2184, 2185).

Pit No. 5 before digging was 2 feet 2 inches deep and excavation was done to the depth of 3 feet 8 inches. Artifacts found were:

(1) A stone celt (2187).
(2) An obsidian arrow point, not finished (2188).
(3) A fragment of a thin obsidian arrow point.

The depth of Pit No. 5 before digging was 3.5 feet and it was excavated to a depth of 3.5 feet. The following artifacts were found:

(1) Five fragments of a clay pot, 2 with ears inside (2214).
(2) A broken stone ax.
(3) Three pieces of pumice for polishing stone implements (2216).
(4) Fig. 19 (2222) a-c. A flint blade for an arrow or throwing dart. Judging by the assymetrical curving it is not finished. Length, 90 mm.; greatest width, 19 mm.; greatest thickness, 7 mm.
(5) A fragment of a stone wedge (2223).
(6) A fragment of a stone implement (2224).
(7) Fragments of one clay pot (2239).
(8) Fragments of another clay pot (2240, 2241).



18. Chisel of quartz schist, Nalacheva Cape.
19. Flint blade, Nalacheva Cape.
22. Lance point of flint, Kulki River.

The depth of Pit No. 6 before digging was 3 feet 10 inches and it was excavated to the depth of 4 feet. Artifacts found were:

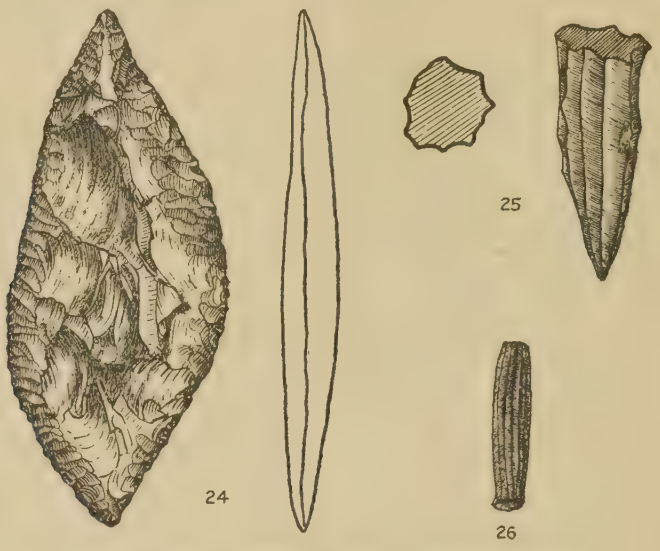
(1) A stone celt (2182).
(2) Fig. 18 (2183). A chisel of greenish gray quartz schist, polished. Length, 62 mm.; greatest width, 20 mm.; width of blade 18 mm.
(3) Three pieces of pumice for polishing stone implements.
(4) A big piece of pumice, with a hole for hanging (2226).
(5) A stone lamp (2228).
(6) Two stone sinkers (2229, 2235).
(7) A stone lamp (2239).
(8) A fragment of a stone ax (2231).
(9) A flat stone sinker (2232).
(10) A fragment of a stone wedge (2233).
(11) Eleven pieces of white clay (2234).

The sketch of map (fig. 20) was drawn by the son of the Governor of Kamchatka, Boris Perfilyev, a naturalist, who accompanied me on my trip to the Nalacheva region. No scale is given.

The following specimens, presented by Governor Perfilyev, were found by Mr. Eckermann, a representative of a fishing company, while digging a cellar in Palan.

(1) Ten pottery fragments with traces of impression of basket work (2217).
(2) A pottery fragment with a hole near the rim.
(3) A pottery fragment with an impression of weaving (2219).
(4) An arrow point of rock crystal (2220).
(5) A fragment of a stone implement.

The Kulki River empties into the River Tighil, 4.6 miles from its mouth. The site is located 1,738 feet from the mouth of Kulki on a hill over the right bank of the river. There were traces of an earthen wall which surrounded the site. The length of the hill was 76 feet; the width, 60 feet. Inside the wall were the remains of two pits, A and B, almost circular in form. The length of pit A



24. Knife-like implement of opaque black flint. Kulki.
25. Nucleus of tawny gray flint. Kavran.
26. Flint nucleus with 12 tiny facets. Kavran.

was 36 feet and its width 25 feet; the length of pit B was 25 feet and its width 21 feet. The digging was done on June 10, 1911, and the soil was still frozen from one foot down. The earth had to be thawed out by fire piles before the digging, thus hampering the work. Some specimens were broken while spading the dirt. The following specimens were found:

(1) Fourteen stone arrow points and other implements (2690–2703). The greatest length was 114 mm.; the smallest, 55 mm. One of the weapons (2692) is illustrated in figure 24 a-b. It is a knife-like implement of opaque black flint. As both assymetrical sides are trimmed, it looks rather to be a newly finished blade of a lance. The implement is very thin for its size. Length, 114 mm.; greatest width, 49 mm.; greatest thickness, 11 mm.

(2) Eighteen pottery fragments with ornaments (2704).

(3) Fifteen stone implements (2705–2719). One of these specimens is illustrated in figure 22 (2712) a-b. It is a lance point of black flint. The stem is thicker than the point. Carefully chipped, the edges are steeply trimmed. The stem was evidently intended to be inserted into a

wooden shaft. Length, 110 mm.; greatest width, 47 mm.; smallest width, 10 mm.; thickness of the narrow end, 9 mm.; of the broad end, 8 mm. Fig. 22, b, shows the side view.

(4) A long stone arrow point (2723).

(5) A stone ax (2724).

(6) Three stone arrow points, not finished (2725–2727).

(7) Stone pestles (see site Kavran, 2729–2733).

On the right bank of the Kavran River, in 6 minutes' walk from its mouth, a site surrounded by a wall of earth was dug out. Within the wall there were three almost circular pits as shown in figure 23. According to a tradition this was the fortified place of Kulki, a strong man of Koryak origin, who used to cross the central mountain ridge of the peninsula in order to fight the chiefs of the Kamchatka valley. The digging of the site was carried to the depth of 2,247 mm., the frozen soil reaching to the depth of 2,095 mm. The shaft dug represented the following layers:

1027 *mm*.....a layer of turf (A).
1287.....clay containing (B) organic remains.
1522.....charcoal, implements, organic remains and clay (C).
1797.....clay containing very little organic remains (D).
2167.....yellow clay (E).
2247.....shingle (F).

The excavation of the site was continued from June 22 to July 10 inclusive. As the soil was still frozen it had to be thawed by burning wood, layer after layer. This, however, did not prevent the breaking by the spade of some of the artifacts while digging. Almost all of the artifacts were found in layer C, and very few of them in layers B and D. The fact that artifacts were discovered only at a certain depth bears witness of the antiquity of the site. The following objects were found:

(1) 24 stone arrow points; the largest is 100 mm. long and the smallest 21 mm. (2665–2688). Of these the following are illustrated: figure 30 (2666), a–c, a laurel leaf-like blade of black flint with some defective trimming. Length, 99 mm.; greatest width, 32 mm.; greatest thickness, 12 mm. Figure 36 (2667), a–b, an obsidian blade of a laurel leaf-like shape, nicely trimmed. Length, 48 mm.; greatest width, 17 mm.; thickness, 10 mm. Figure 29 (2668), a–c, an arrow point of black flint, with small facets and symmetrical sides finely trimmed. Length, 60 mm.; greatest width, 16 mm.; greatest thickness, 8 mm. Figure 35 (2685), a small arrow blade of black flint. Length, 21 mm.; greatest width, 10 mm.; greatest thickness, 4 mm.

(2) Fragments of pottery (2689, 2720, 2721).

(3) A stone ax of quartz limestone (2728).

(4) A lance point of tawny gray flint, rudely chipped, evidently not finished. Length, 222 mm.; greatest width, 44 mm.; greatest thickness, 40 mm. See figure 33 (2723).

(5) Five stone pestles (2729–2733) of the sites Kulki and Kavran, used for grinding food of edible plants and roots mixed with meat, fat or animal oil. The largest found in Kavran was 228 mm. long and is illustrated in figure 28 (2733) a–b. Made of quartz slate.

(6) Three fragments of Japanese porcelain cups (2746).

(7) Two pieces of iron (2745).

(8) Shells of mollusks (2747).

(9) 35 fragments of bone arrow heads (2747a).

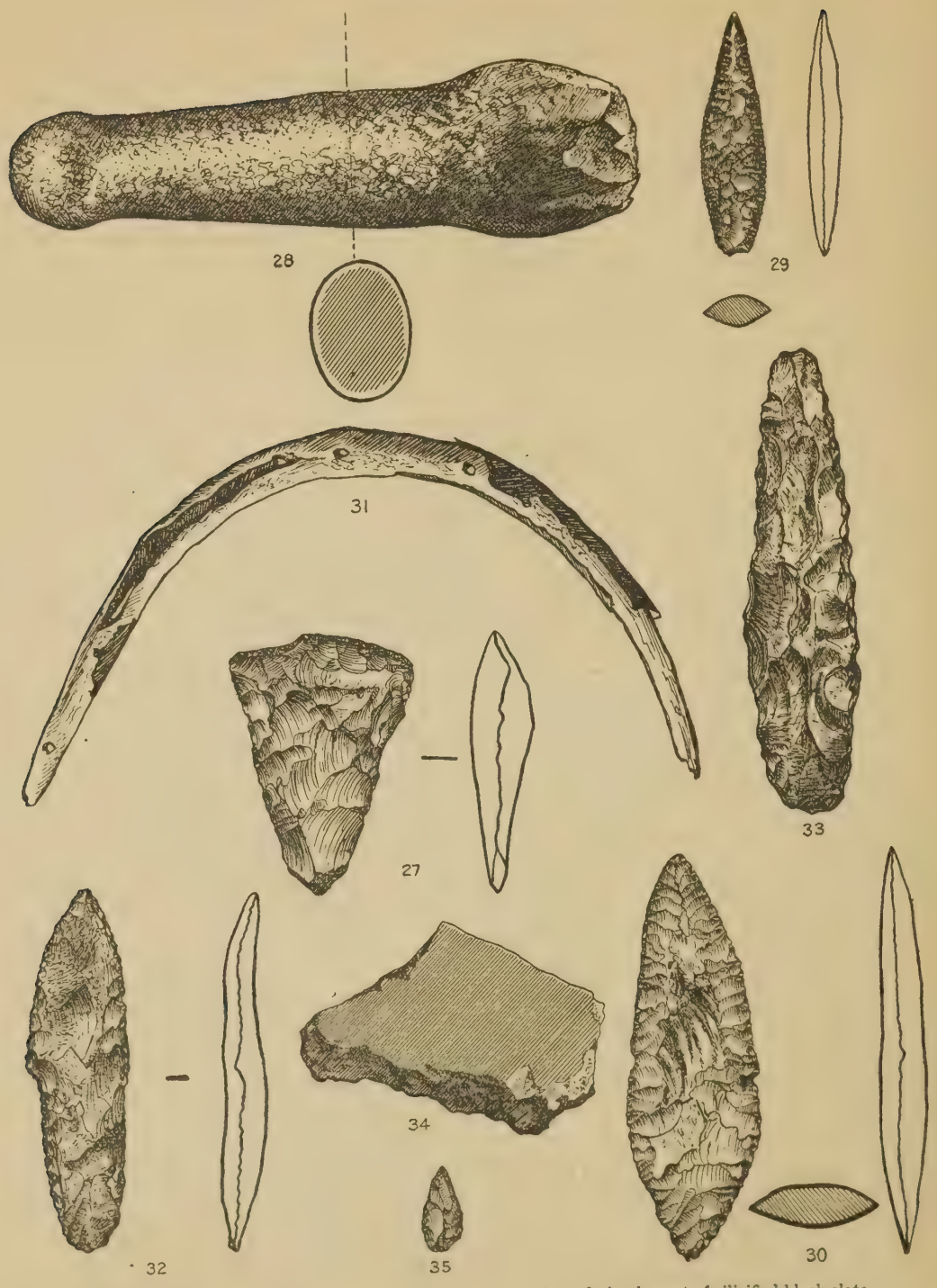
(10) The bone part of a root digger (2748), in Kamchadal qazqar.

(11) The same as No. 10 (2749).

(12) A bone arch which served as stanchions of an ancient Kamchadal dog sledge, in Kamchadal msan. Illustrated in figure 31 (2750), 4/15 of natural size.

(13) Two bone hooks (2751, 2752). The first hook is illustrated in figure 43, 1/3 natural size; the second in figure 50.

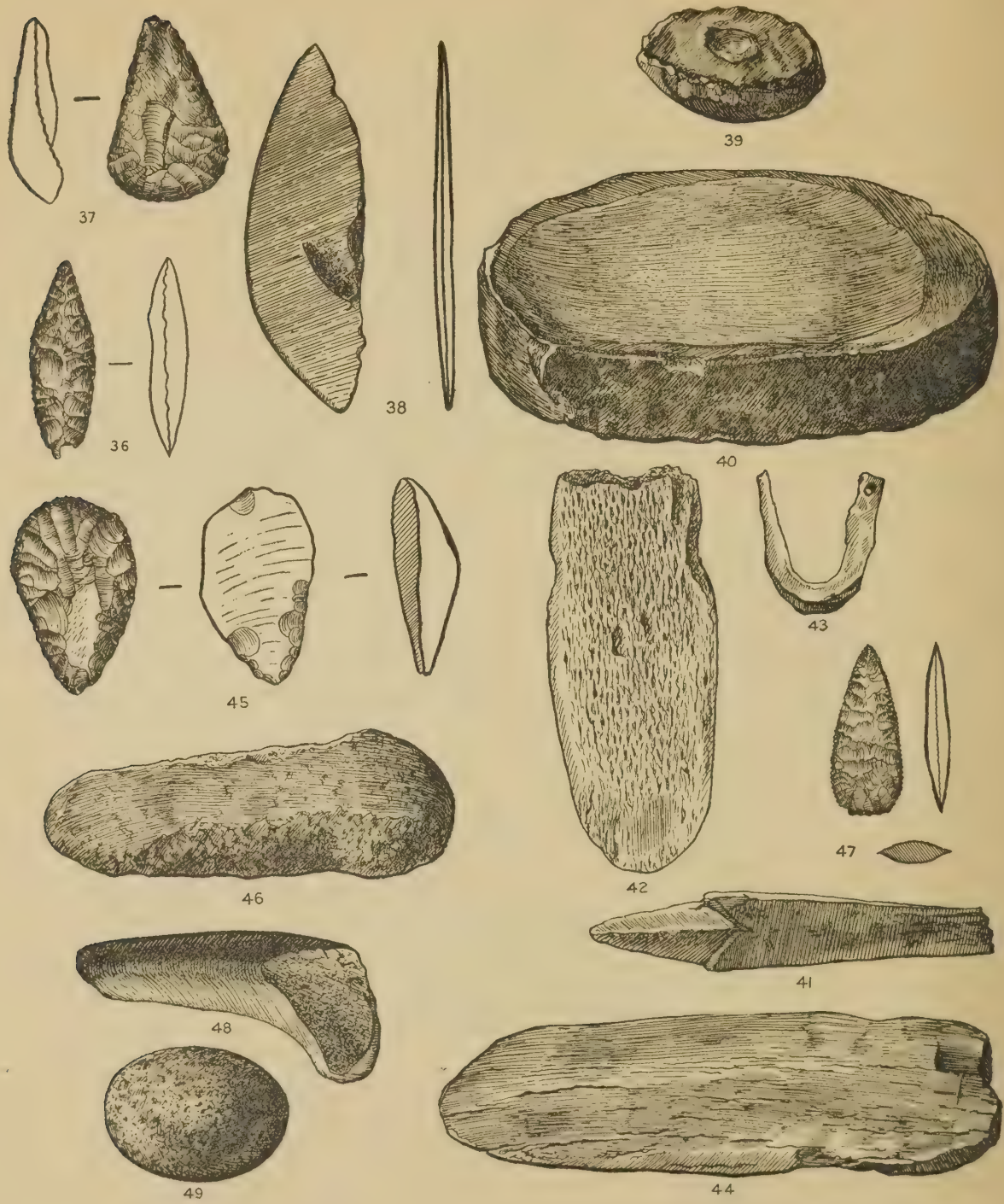
(14) Fragments of bone implements (2753–2756).



27. Flint scraper.
28. Stone pestle of quartz slate.
29. Arrow point of black flint.
30. Laurel leaf-like blade of black flint.
31. Bone arch of an ancient Kamchadal dog sledge.
32. a-b, implement of silicified black slate.
33. Lance point of tawny gray flint.
34. Whetstone of volcanic tuff.
35. Small arrow blade.

All of Kavran.

(15) Two bone spades (2757, 2758).
(16) The bottom of a Japanese porcelain cup (2759).
(17) A piece of pumice (2766).
(18) A whetstone (2767), for polishing stone implements, of volcanic tuff. Illustrated in figure 34, 4/9 of natural size.
(19) 27 stone arrow points (2768–2794). Of these specimens the following are illustrated: figure 25 (2768), a nucleus of tawny gray flint from which flakes had been evidently obtained by striking with a hammerstone vertically from above; nine facets; the horizontal plane is assymetrical. Length, 49 mm.; horizontal plane, 21 by 18 mm. Figure 26 (2786), a flint nucleus of a little darker tint than the preceding one, of a cylindrical shape, with 12 tiny facets. Length, 35 mm.; the transverse plane section, 9 by 8 mm. Figure 27 (2775) a–b, a scraper of black flint, nearly triangular, slightly rounded and finely trimmed on the working edge, which has a hollow from one side. The other two sides of the triangle are irregularly trimmed and rudely chipped. The top end might serve as a graver. Greatest length, 62 mm.; greatest width, 45 mm.; greatest thickness, 13 mm. Figure 32 (2772) a-b, an implement of silicified black slate. Evidently a knife for working in wood. The straight stem might be kept as a handle or inserted in a wooden handle. The edge for cutting is somewhat curved. Length, 88 mm.; greatest width, 25 mm.; greatest width of the stem, 10 mm., thickness of the blade, 8 mm.
(20) 17 stone implements (2795–2811). Of these specimens the following are illustrated: Figure 37 (2795), a–b, scraper of black obsidian almost triangular in form, with a rounded working blade and shallow, enlongated, finger-like facets. From one side both edges are retouched, the other side has only one edge retouched. Greatest length, 47 mm.; greatest width, 31 mm.; thickness, 12 mm. Figure 38 (2801) a-b, a woman's tailoring knife, polished from both sides, similar to the Aleut-Eskimo women's knives of the same kind. There were evidently holes on the upper part for fastening to a wooden handle. Greatest length, 93 mm.; greatest width, 30 mm.; thickness, 2.5 mm.
(21) Nine stone implements (2812–2839).
(22) Six bone implements (2821–2826).
(23) Thirteen bone implements (2827–2839).
(24) Nine bone implements (2840–2848).
(25) Five bone implements (2849–2853).
(26) Nine fragments of bone implements (2854–2862).
(27) One bone implement and 12 pottery fragments (2863–2875).
(28) A stone sinker (2864).
(29) Figure 39 (2866), a drill head of quartzite, 2/5 natural size.
(30) A stone sinker (2865).
(31) A stone celt (2867).
(32) Figure 42, a bone spade (2868), 1/3 natural size.
(33) Six pottery fragments (2869).
(34) Four stone pestles (2870–2873).
(35) A bone knife for splitting the willow-herb (*Epilobium angustifolium* L.) (2874). Illustrated in figure 41.
(36) Two bone spoons (2875, 2876).
(37) Eleven stone implements: celts, arrow points and knives (2877–2887), the longer of which was an obsidian knife, length 150 mm.
(38) Figure 40 (2888), a stone for grinding paints, of quartz slate, 4/15 natural size.
(39) An obsidian celt (2890).
(40) A large stone pestle (2891).
(41) Two skulls (2917, 2918).
(42) Three stone lamps (2921–2923).
(43) A piece of a whale's lower jaw (2924).
(44) Two stone pestles (2926, 2927).
(45) A stone sinker (2928).
(46) A whetstone (2929).
(47) A stone sinker (2930).
(48) A large whetstone (2931).
(49) Figure 48 (2932), a stone hammer of volcanic tuff used in the manufacture of stone lamps and grooving stone sinkers, 1/3 natural size.
(50) A whetstone (2933).
(51) A fragment of a stone pestle (2934).
(52) Figure 49 (2935), a quartz pebble used in the game called matka, 2/3 natural size.
(53) Pottery fragments (2937).



36. Obsidian blade.
37. Scraper of black obsidian.
38. Woman's tailoring knife of slate.
39. Drill head of quatzite.
40. Stone for grinding paints of quartz.
41. Bone knife for splitting willow herb.
42. Bone spade.
43. Bone hook.
44. Bone shovel for digging.
45. Obsidian scraper.
46. Stone pestle for grinding food.
47. Obsidian blade.
48. Stone hammer of volcanic tuff.
49. Quartz pebble used in game.

All specimens found at Kavran.

50. Bone hook for hanging fish for drying. Kavran.
51. Fragment of some bone implement, much decayed, possibly a part of a sledge runner. Kavran.
52. Bone hook of reindeer antler, probably used as a root digger. Kavran.
53. Scraper-like implement of quartzite. Kuril Lake.
55. Small arrow blade of brown reddish flint. Kuril Lake.
56. Lance blade or knife of greatly silicified slate. Kuril Lake.
57. Unfinished blade of greatly silicified slate. Kuril Lake.
58. Scraper of gray dark flint. Kuril Lake.
59. Adze of quartz schist, rudely chipped, with a polished blade from both sides. Kuril Lake.

(54) Four ornamented pottery fragments (2940).
(55) Figure 51 (2941), fragment of some bone implement, much decayed, possibly a part of a sledge runner, 2/9 natural size.
(56) Figure 52 (2943), a bone hook of reindeer antler, probably used as a root digger, 1/3 natural size.
(57) Two handles of bone spoons (2944, 2945).
(58) Six fragments of bone implements (2946).
(59) Four fragments of bone implements (2947).
(60) Seven fragments of bone implements (2948).
(61) Four scrapers (2949).

We see from the number of specimens found (about 230), that the excavation of the Kavran site was particularly productive.

The ancient site on the bank of the Osernaya River is 2 miles from the point where it flows out to the sea from the Kuril Lake. There were several depressions of former dwellings, and we excavated the largest of these. The pit before digging was 2 feet deep. Then followed a layer of black earth more than a foot deep, after which the primeval soil consisting of gravel appeared. In the layer of black earth were found traces of a fireplace, two whetstones, two pottery fragments, one of

54

which had a handle inside, and a Japanese coin. Remains of posts were not discovered. The pit had a rectangular form like the pits on the shores of the Nalacheva Lake. Those of the Kulki and Kavran Rivers had rather a circular form.

Higher in the rocky bank over the described pit was a small depression resembling a pit. We excavated it and found a layer of mold about a foot deep in which were only a fragment of pottery, with an ear inside, and some bones of a bear.

We came to the ancient site on the shore of the Kuril Lake on August 8 and diggings were carried on from August 9 to 14. We left the lake August 16. In order to reach Lake Kuril we had to ascend the Osernaya River, flowing out from the lake into Okhotsk Sea. The river is fifty-five miles long. .

The mouth of the river is connected with some historical episodes. During the Russian-Japanese War, in May of 1905, a fleet of Japanese schooners landed there with the intention of taking possession of Kamchatka. The Japanese were volunteers, numbering 150, under the command of the retired Captain Hundzi Naridata. At that time there was no settlement at the mouth of Osernaya River. The Japanese put up a trenched camp, mounted their only cannon and hoisted a Japanese flag. Except the visit to Petropavlovsk by Admiral Togo's squadron,

this was the only attempt to take Kamchatka by force, and it ended very unhappily for the Japanese.

When the Japanese were marching along the coast to the village Yavino, its inhabitants fled into the mountains, abandoning their houses, belongings, cattle and dogs. The Japanese finding no one in the village, occupied the Russian houses, hoisted a Japanese flag over the chapel and put up a post with a declaration of the annexation of Kamchatka to Japan. Some days later the Japanese returned to Osernaya taking with them all the cattle, horses and dogs from Yavino.

In the meantime a troop of Russian militia under command of Ensign Shaba arrived at the mouth of the Yavino River in a schooner from Bolsheretzk, and another detachment under Lieutenant Sotnikoff reached Yavino by land. Sotnikoff took command of both detachments. The combined Russian forces numbered only 80, and Sotnikoff did not venture an open attack but took refuge in a ruse. He despatched a man to Hundji, who pretended he had been sent by the inhabitants of Yavino to ask for a doctor and victuals. Hundji, a doctor and two interpreters all unarmed left Osernaya for Yavino. Along the way they were attacked from ambush. The interpreters were shot and Hundji and the doctor captured. Later a Russian detachment had a skirmish with a Japanese vanguard in which one Russian was killed and three were wounded. The Japanese doctor dressed their wounds. On the following morning the Japanese shot the cattle and dogs and left Osernaya in their schooners for the south.

This adventure resulted in the killing by the Russians of peaceful Japanese fishermen in many villages on the western coast of Kamchatka. Usually the Kamchadal are well disposed toward the Japanese, who are just in their relations to the former, attending their sick and furnishing them with medicine.

After the Russian-Japanese War many Russian adventurers, mostly discharged soldiers, found their way from Vladivostok to Kamchatka. Some were attracted by reports of rich profits obtained by sable hunting, others by the desire to introduce agriculture in Kamchatka, but they all remained and mixed with the native fishing population, Kamchadal and Russians. Another company of adventurers settled at the mouth of the Osernaya River, forming a new village. At first their condition was deplorable. Fishing was abundant but there was no market for exchange. They had no money, flour, tea and other commodities to which they were accustomed in their native places of European Russia. The women particularly longed for bread, and often said: "We would give up all the fish for one piece of bread, not mentioning our melons, fruits, meat, milk products and sweets." The majority of the immigrants were Ukrainians of southern Russia.

But two years before our arrival there all had changed. Enterprising firms, partly with American money, began to develop fisheries for the export of Kamchatka salmon. A saltery and a cannery were established in Osernaya and the Russian colony there worked during the short summer as laborers. The fishing company furnished them with money, food, clothing, fuel and building material and they were able to withstand the hardships caused by the most inhospitable of

seas, the Okhotsk, and the severest of climates. The factories were closed for the eight winter months, but the summer was very busy. Scores of laborers were brought on the company's steamers from the Amur River. Not all the necessary structures were ready at that time, and the imported laborers slept under the cover of primitive shades. Mountains of salt lay in the open, melting from rains. A part of the laborers were busy preparing a kind of caviar from the roe of

63

salmon. After taking out the roe they threw overboard the split fish, causing an enormous waste of food-material. The laborers in the saltery and cannery threw out from their seines all other fish than salmon, and from the latter the hump-back salmon, which was not in favor with the foreman of the plant.

From information gathered before my trip to the lake I knew that there were several pits of ancient dwellings (see the map of the Kuril Lake). The natives have either died out or were exterminated by the Russian conquerors. My party

consisted of myself, Mrs. Jochelson as assistant and physician to the party, and eleven laborers, of whom seven were Russians, three Kamchadals and one Japanese.

The Osernaya River, with its slanting bed, rocky banks, rapid falls and curves, forms a most difficult and dangerous route of travel. We had two boats and two canoes. One of the boats was for Mrs. Jochelson and myself; the other carried the tents, instruments, food and other supplies. The canoes served for reconnaissance and errands requiring despatch. It was very difficult to make progress on the turbulent river, particularly on the way up. Several times we had to disembark and carry our freight on our shoulders, while the boats were pulled by ropes through the rapids. (See Plate 5, figs. B, C.)

While there are no human habitations anywhere in the country, we were amazed to find well-beaten paths in the forests and on the mountains above the river, as if there were numerous human settlements. But realizing that these were roadways made by bears, we walked cautiously amid the dense vegetation with rifles ready for action. We did not see any bears while following these paths, but we heard the breaking and cracking of bushes and tree branches, and on the ground we found pieces of fresh salmon, the remnants of the bears' meals. The animals are very nervous and easily become alarmed. They have sufficient reason to be afraid of a man with a gun.

It is well known that at Lake Kuril and in its vicinity scores of bears are to be found. The abundance of fish and of many kinds of berries furnishes them ample food and favors their increase in number. The sparsity of human population is also favorable to the multiplication of the bears, although the few hunters of the coastal villages annually kill them by the hundreds.

After five days of painful effort we finally reached our destination. It was a windy day and our frail boats nearly capsized on the stormy lake, which is surrounded by the peaks of extinct volcanoes and by steaming hot sulphurous springs, the temperature of which reaches 100° C. (210° F.) and more. From our boat we observed steaming springs on the banks of the Osernaya when nearing the lake, but we had no time to stop to investigate them. We were told that the Kamchadal from Yavino and the Russians from Osernaya dig pits by the hot springs for bathing and curing different diseases. The temperature in these baths is reduced to 50° or 40° C.

From the head of the Osernaya River I directed my fleet to the Siwusk Cape (see map of Kuril Lake and Plate 5, fig. A). While excavating there we were entertained every day by the sight of bears fishing and gathering berries, particularly when we increased our field of observation by the use of opera glasses. The bears stood with their hind legs in the mountain rivers and creeks, and with their front paws managed to throw out on the banks the sea salmon, which in order to spawn ascend the rivulets that flow into the lake. The bears went after their prey and eating off the heads and spines, which are the most palatable parts of the fish, cast away the remainder. Their movements, turning, leaping and jumping, were so amusing that we could not restrain our laughter.

My laborers were anxious to hunt bears, but I could not allow them to go on such an undertaking as the time was short and a Government steamer was expected on a certain date at the mouth of the Osernaya River to take my party to Petropavlovsk. However, I once allowed two of them to go for a night hunt and they secured a little bear cub. They cooked and ate the meat.

On the morning of our contemplated departure from Lake Kuril, when all the specimens found in the excavations had been packed, the lids of the boxes nailed down and the boats loaded, I was tempted to linger just a little longer upon seeing two she-bears playing with their cubs on the other side of a pond in the rear of the promontory. I accordingly delayed my departure until the afternoon, and singling out two of the best marksmen from my party, and equipped with a stereoscopic camera and a motion-picture camera, I started in the direction of the bears. We had to undress in order to cross the Etamenk River in the rear of the promontory, and to carry on our heads the bundles of clothing, the rifles and the cameras, so that they might not get wet. We reached the other bank of the river, dressed ourselves, and tried to pass as noiselessly as possible through the little jungle which led up to the open meadow where the she-bears were playing with their cubs.

We stopped on the outskirts of the forest and put up the cinema and stereoscopic cameras. As the bears were still too far away, I told one of my two men to make a circuit about them and frighten them from the rear so that they might come nearer to us. Both cameras were in readiness to take pictures, when suddenly at a distance of about thirty yards appeared a young black bear quietly passing by. I quickly took a stereoscopic snapshot and was about to start with my cinema, but the bear became frightened by the clatter of the falling shutter of the photographic camera and, instead of running away, rushed in our direction. We had no choice but to aim at his head and fire as he neared the camera.

After ascertaining that the bear was dead, we looked around. None of the other bears were to be seen; they had been frightened by the shooting and had disappeared. As I could not remain on the lake any longer, I had to give up the idea of another attempt to approach bears with peaceful intent. The bear that was killed appeared to be not more than three or four years old. I took the skin and the meat of a hind leg for the laborers.

We returned to our camp late in the day and were compelled to spend one more night on the promontory. Next morning, our archæological mission fulfilled, we started our journey to the sea.

The proceedings and results of the excavations were as follows: I selected for digging the ancient village site on a cape or rather a small peninsula in the southwestern part of the lake. The Kamchadal call this cape Siwusk (see map of the lake). The village was located on the rocky extremity of the cape and on its slope near the small inner lake. The extremity of the cape rises over the lake about 16 meters. The sides of the inner lake which join the cape with the mainland are about six feet wide. From both sides of the cape two small mountain

rivers empty into the lake. They are rich in migrating salmon, which ascend the Osernaya River from the Okhotsk Sea to the lake for spawning in dense masses and attract numerous bears roaming the country.

Eighteen pits were dug—15 on the rocky hill and 3 below, where our tents are to be seen on Plate 5, figure 1. The general depth of the culture layers was about 3 feet. The pits under the hill were larger and seemed to be more ancient than those on the hill. No iron objects were found, but they yielded numerous pottery fragments, with handles inside, but no ornamentation. The pits were located mostly on the eastern slope of the hill, over a steep standing rock, and the outer margins of the pits seemed to have fallen down. The angles of the pits were somewhat smoothed; originally, however, the pits seemed to be quadrangular in shape, with the sides from 24 to 30 feet long. On the top of the cape was one pit of larger dimensions, probably that of a communal house for gatherings and festivals; this pit yielded a small quantity of objects; the greatest number of artifacts were furnished by the smaller pits. The following artifacts were found in the pits of the Kuril site:

(1) Nine arrow points (2959–2967) of quartzite and flint, the longest being 141 mm. (Plate 6, A).

(2) Twenty obsidian arrow points (2968–2987) (Plate 6, B). The greatest length was 80 mm. and the smallest 18 mm.

(3) Seventeen stone knives and other implements (2988–3004). The largest implement was 72 mm. in length (Plate 7, figs. 1–17).

(4) Twelve stone scrapers (3005–3016); the largest was 93 mm. in length (Plate 7, figs. 18–29).

(5) Twelve stone scrapers and other implements (3017–3028), the greatest length being 97 mm. (Plate 8, figs. 1–12).

(6) Eleven stone implements (3029–3039), some of them not finished. The greatest length was 100 mm. (Plate 8, figs. 13–23).

(7) Fragments of stone implements (3040).

(8) Forty-nine stone scrapers (3041–3089).

(9) Thirteen bone awls (3090–3102) Plate 12, figs. 1–13).

(10) Thirteen bone arrow heads (3103–3115) (Plate 12, figs. 14–26).

(11) Eight bone ornaments and other objects (3116–3123).

(12) Five bone implements (3124–3128) (Plate 13, figs. A).

(13) Fragments of bone implements (3129).

(14) Six fragments of bone implements (3130–3135) (Plate 13, fig. B).

(15) Four stone lamps (3136–3139) (Plate 14, figs. 4–7).

(16) Three stone lamps (3140–3142) (Plate 14, figs. 1–3).

(17) Three stone lamps (3143–3145) (Plate 14, figs. 4–6).

(18) Remnants of weaving (3151–3152).

(19) Pottery fragments of different pits (3153).

(20) A pottery fragment; the whole height of a pot (3154).

(21) A stone lamp; the first stage of manufacture (3157).

(22) Figure 66. A stone lamp of andesitic lava in process of manufacture (3158), 4/9 natural size.

(23) A pottery fragment from Pallan. A gift from the Governor of Kamchatka (3159).

(24) Three stone lamps (3165–3167) (Plate 15, figs. 1–3).

(25) Five stone lamps (3160–3164) (Plate 15, figs. 4–8).

(26) Seven stone axes (3168–3174). The largest is 197 mm. long (Plate 9, figs. 1–7).

(27) Twelve stone axes (3175–3186). The greatest length is 152 mm. (Plate 9, figs. 8–19). One of these specimens is illustrated in the text-figure 59 (3183). It is a rudely chipped adze of quartz schist, with a blade polished on both sides. Length, 122 mm.; greatest width, 25 mm.

(28) Four stone sinkers (3187–3190) (Plate 10, figs. 1–4).

(29) A stone sinker (3191) (Plate 10, fig. 7).

(30) Two stone sinkers with holes (3192, 3193) (Plate 10, figs. 5, 6).

(31) A stone pestle (3194) (Plate 10, fig. 8).

(32) Six whetstones and one sinker (3210–3216) (Plate 11, figs. 1–7).

(33) Fifteen stone implements (3195–3209): axes, arrow points, awls and sinkers (Plate 11, figs. 8–22).

(34) Text-figure 60 (3217). A scraper of silicified slate; chipped from one side only; the curved working end is trimmed; the other side of the implement is flat with a few irregular chippings. Length, 60 mm.; greatest width, 38 mm.; thickness, 14 mm.

(35) Three pieces of pumice (3218).

(36) Four whetstones (3219).

(37) Thirteen broken stone lamps (3220–3232).

(38) Two stone axes (3233, 3234). One found near Petropavlovsk.

(39) A whetstone (3235).

(40) Paint (3236).

(41) A bone screw, double threads (3237).

(42) Ten iron and 1 copper implements (3238).

(43) Two stone hammers for chipping stone implements (3239).

(44) Different fragments (3240) of stone points.

(45) Fragments of wooden vessels (3241).

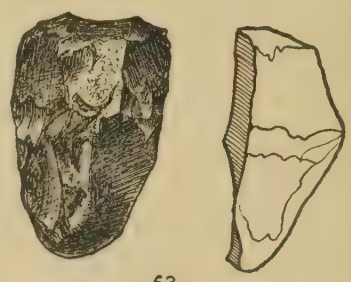
(46) A skull with the lower jaw (3242).

60

Scraper of silicified slate.

61

Arrow blade of white chalcedony.



62

Scraper-like implement of silicified slate.

All specimens from Kuril Lake.

(47) Skeletal bones (3243).

(48) Two separate bones (3244).

(49) Two bone implements (3245).

(50) Pottery fragments (3246).

(51) Text-figure 61 (3247), a, b. An arrow blade of white chalcedony. General length, 67 mm.; length of the stem, 31 mm.; greatest width, 23 mm.; greatest thickness, 7 mm.

(52) Eighteen fragments of stone implements (3248–3265).

(53) Text-figure 62 (3269). A scraper-like implement of silicified slate, evidently remade from a polished adze, as shown by the polished upper part. Length, 52 mm.; greatest width, 32 mm.; height of the working edge, 18 mm.; greatest thickness, 23 mm.

(54) An obsidian arrow point (3280).

(55) Two stone scrapers (3298, 3299).

(56) Three Japanese coins of the eleventh century (3306–3308). See above, p. 37.

(57) Three fragments of ornamented bone implements (3309).

(58) A stone celt (3311).

(59) A scraper-like or some other not completed implement of quartzite. Greatest length, 45 mm.; greatest width, 48 mm.; thickness of the working end, 18 mm. Judging by the great thickness as compared with the length and width it probably may be a rejected piece, due to malformation. Text-figure 53.

(60) A small arrow blade of reddish-brown flint. Length, 31 mm.; greatest width, 10 mm.; thickness, 3 mm. (2967). Text-figure 55.

(61) A lance blade or a knife of greatly silicified slate. One side is more convex, as shown by the transverse section. Length, 141 mm.; greatest width, 41 mm.; greatest thickness, 12 mm. (2958). Text-figure 56.

(62) Not finished blade, evidently intended to be subsequently elaborated into an implement of a specialized type. It might also serve as a scraper. Of greatly silicified slate. Length, 98 mm.; greatest width, 50 mm.; greatest thickness, 28 mm. (3029). Text-figure 57.

(63) A scraper of dark gray flint; one side is flat with some chippings from one edge; the other side is regularly convex with broad chippings. The working edge is rounded. Length, 41 mm.; greatest width, 26 mm.; thickness 9 mm. (3075). Text-figure 58.

(64) A stone lamp of sandstone with an ear for tying it to the sledge or canoe when traveling or hunting. 4/9 natural size (3140). Text-figure 64.

(65) A stone lamp for the dwelling, of porphyrite, 1/3 natural size (3141). Text-figure 65.

As stated above, we left the Kuril Lake on August 16—a quiet calm day. We crossed the lake, on the right being the rocky almost triangular Alaid Island, where millions of birds were crying and rioting. The Japanese writer R. Torri[1] refers to a Kurilian tradition, according to which in ancient times a high mountain rose where we have now the Kuril Lake. It was a handsome lady, and the neighboring summits, jealous of her, made her life unbearable by mockery and sneering, so she decided to leave Kamchatka and settled in the open sea. This became a small rocky island, Alaid (in Aino, Chachakotan), located to the northwest of the Paramushiri Island, and Kuril Lake formed in the cavity. Baron Dittmar refers to another variant of the Kamchadal tradition concerning the origin of the Kuril Lake. There was formerly a volcanic summit Alaid, which disliked its location and wandered over to the sea. In the cavity left by the mountain, the Kuril Lake originated. The mountain, however, left a piece of rock in the middle of the lake which the Kamchadal call Heart-Rock or Navel-Rock. Kuril Lake, according to Dittmar, is the second greatest lake of Kamchatka, Kronotzkoye Lake being larger.[2] Geologists explain the origin of the Kuril Lake by the sinking of an old crater. The lake now lies 200 meters above sea-level and its depth in some places reaches 300 meters.[3]

The trip back to the seashore took us less than a day. Our boats were speeding and leaping over the rocks of the stony bed of the Osernaya River so that we had to use poles as brakes in order not to be overturned, particularly on the dangerous curves. Hunters, who come in spring on dog sledges to the Kuril Lake to kill bears, make quite primitive boats of twig-frames covered with bear skins in order to transport skins to the mouth of the Osernaya River. These skin-boats easily glide over the rocky rapids.

As I feared, the Government steamer had left for Petropavlovsk a day before we reached the shore. It did not stop at Osernaya, passing from the western strait to Petropavlovsk through the Kuril Strait. The fall storms had begun in the Okhotsk Sea and it was dangerous for the steamer to approach the coast, which has no harbor. We might have had to remain in Osernaya for the winter if it had not been for the administrators of the saltery and cannery, who were waiting for a special steamer before closing the plants. They had already sent off on a freight steamer the imported laborers and salted and canned goods. On the next day the

[1] Torii, *Études Archéologiques et Ethnologiques: Les Aino des Iles Kouriles*, Journal College of Science, Imperial University of Tokyo, vol. XLII, Tokyo, 1919–1921, p. 39.

[2] Carl von Dittmar, *Travels and Sojourn in Kamchatka in 1851–1855*, Part 1, St. Petersburg, 1901, p. 684 (in Russian).

[3] See *The Kamchatka Expedition of F. P. Riaboushinsky*, Zoological Division, Part I; P. J. Schmidt, Moscow, 1916, *The Investigations of the Zoological Division in Kamchatka in 1908–1909*, Chapter XII, written by Dr. A. N. Dershavin, one of Professor Schmidt's assistants.

longed-for smoke of a steamer appeared on the horizon, but it cruised in the sea many miles away, as it was not safe to come near the shallow shore in the turbulent weather. After three days of waiting the storm subsided, the steamer came nearer and a large boat was despatched to take us aboard. High waves almost capsized the boat and finally did at a distance of a few feet from the shore. We saw with horror that the four sailors were covered by the boat, but in a moment they appeared from beneath it with the rope in their hands and dragged the boat to the shore. When they had dried themselves in one of the houses we trusted ourselves and our collection from Kuril Lake to the frail boat and after two hours of struggle with the sea we mounted the rope-ladder of the steamer. Never before have I had such a stormy sea passage. After 5 days of sickness, sailing through the Kuril Strait, we reached Petropavlovsk, which we left for Vladivostok several days later on the last mail steamer of the season. The following remarks concerning the finds made on the Kuril Lake and the form of sites discovered in Kamchatka in general are necessary.

From the remnants of objects of Japanese culture no inference can be made as to the age of the sites. As we saw before (see p. 62) Japanese objects, such as coins, pieces of porcelain cups and metallic artifacts, might have reached Kamchatka at a very early date. Krasheninnikoff says (I, p. 48) that the old Kamchadal knew the art of hammering fragments of metal. They did not temper iron but, placing it cold on a stone, forged it with another stone instead of a hammer. If the eye of a needle broke, they flattened the broken end and drilled a new eye with another needle.

According to Steller (p. 320), the Kamchadal paid homage to pieces of iron obtained from the Kurilians. The iron was set up on a pole in front of the dwelling as proof of the wealth and special importance of its owner. Krasheninnikoff also states (II, p. 97) that every Kamchadal possessing a fragment of iron was deemed rich and lucky.

The Kamchadal, now Russianized, no longer live in subterranean houses, replacing the same by Russian block houses, or by huts of the Yakut type, also introduced by the Russians. According to the descriptions of Krasheninnikoff and Steller, the ancient Kamchadal earth-hut had no entrance room such as the Koryak use in their underground dwellings during the summer. The Kamchadal earth-hut was only a winter dwelling. Its smoke hole in the ceiling served at the same time as a window and door, through which one entered by descending along a log with notches or holes. This was the only entrance opening, but there was, however, an underground passage in the shape of a narrow channel, for the draught, which started from the hearth and came out of the house at the side. Women, children and the so-called transformed men used to go in and out through this passage. From the illustrations of the excavated pits of ancient Kamchadal dwellings we see that the channel-passage was an indispensable part of their habitations, and we see also from illustrations that it could be directed to different cardinal points. We may only surmise the reasons for such a diversity. We know that many of

the Siberian tribes, for instance the Yakut and Buryat, have the entrance of their dwellings faced to the east, where the sun rises. The sun is regarded as a benevolent deity and it is advisable to have the door facing the sun in order to get its benefits. The back of the dwelling is turned to the west, the abode of evil spirits. The entrance of tents of nomadic peoples (Chukchee, Koryak, Tungus, Yukaghir and others) faces the east for the same reason. On the other hand the door of dwellings of maritime peoples faces the sea in order to give free access to sea-mammals, as though they were visitors. For the same reason the entrance of summer tents of Siberian fishers faces the river. According to Professor Petri the dwellings of the neolithic people of the Baikal region, the remnants of which he discovered, had entrances facing the south, the side of the sun's highest standing. Thus we can comprehend why the channel passage of the old Kamchadal dwelling faced, in some cases, the sea, in others the lake or a river in accordance with food, which one or another water basin supplied.

The shape of the pits was mostly oblong rectangular. On the Kuril Lake the pits were more or less quadrangular. The northern pits on the Kavran and Kulki Rivers were almost circular in form, thus nearing the shape of underground dwellings of the Koryak. The channel-passage is fitted in some cases to the middle of the oblong side of the pit and in others to the middle of the transverse side.

The largest pit, 34 by 30 feet, was excavated on the Nalacheva Cape and the smallest, 16 by 15 feet, on the Nalacheva Lake. The length of the channel passage ranges between 7 and 16 feet. With few exceptions, the channel-passage is longer, the larger the pit.

As the present remains of the pits of the former pit-dwellings are undoubtedly smaller than the former dwellings themselves, on account of earth and sand deposited by winds and accumulated mold from decayed grass, we may draw the conclusion that the ancient Kamchadal population was rather numerous and Kamchatka was densely inhabited. The pits are very near each other, and the shores of the Nalacheva Lake, as well as other places in Kamchatka, are covered with them. According to Krasheninnikoff, each pit-dwelling sheltered several related families. Often several pit-dwellings were located in one place, forming a village surrounded by earthen walls and trenches.

The Kamchadal pit-dwellings were used only during the winter. In the summer the Kamchadal lived in huts on piles several meters high. They were ascended by means of notched logs which could be drawn up to the platform of the huts. At present these elevated huts serve as storehouses. In some places, however, they are still used as summer dwellings (see Plate 4, B).[1]

In the pit excavated on the Osernaya River near the Kuril Lake, no traces of wooden posts were discovered. This may be regarded as a witness of the great age of the pit—the posts having decayed to such a degree that no trace of them is left.

[1] The summer pile-dwelling is also in use among the Gilyak but its posts are not as high as those of the Kamchadal pile-dwelling. The pile-dwelling, as an adoption from Siberia, is also reported from some places in Alaska (see H. P. Steensby, *An Anthropo-geographical Study of the Eskimo Culture*, p. 188). The storehouse on posts is known everywhere in Siberia, as well as in North America.

According to Krasheninnikoff the ancient Kamchadal had still another kind of summer dwelling, the superterrene grass lodge called bashabash. Unfortunately he does not state its shape—whether it was of a conical or hemispherical type. The bashabash was put up at the fishing places near the dwellings on piles and served chiefly as a place for cooking, which could not be done on the wooden platforms of the pile-dwellings.

White clay, pieces of which were found in some of the excavations, was eaten by the Kamchadal, according to Krasheninnikoff (II, p. 180), as a remedy for diarrhœa. Bogoras relates (*The Chukchee*, p. 200) that the reindeer Chukchee, the Koryak and Lamut in Kamchatka, occasionally use as food a kind of white clay called by them nute-ecen (earth-fat). The Kamchadal called the white clay "earth sour cream." Sternberg tells (*The Gilyak*, p. 17) of a Gilyak favorite dish for treating guests, called moss, which consists of a mixture of the gluey broth of fish skins, seal's fat, berries, rice, and sometimes of minced dried fish, to which the solution of white clay is added.

It must be noted that the use of some kinds of clay as food is not limited to Siberia alone. The eating of edible clay has been observed among certain Guiana Indians,[1] Carib and Antillean islanders,[2] and among the people of Georgia and the Carolinas.[3] Deniker refers to many other places where the habit of eating certain earthy substances—kaolin, clay, limestone—has been observed. He calls this habit *Geophagy* and explains it by the need of supplying the needed mineral substances (calcareous or alkaline salts).[4]

[1] W. E. Roth, *An Introductory Study of the Arts, Craft and Customs of the Guiana Indians*, Annual Report of the Bureau of American Ethnology, 1924).

[2] William Sheldom, *Brief Account of the Caribs who Inhabited the Antilles*, Transactions of the American Antiquarian Society, I, 1820, pp. 365–435).

[3] Charlotte D. Gower, *The Northern and Southern Affiliations of Antillean Culture*, Memoirs of the American Anthropological Association, Number 35, 1927, p. 26.

[4] J. Deniker, *The Races of Man*, London, 1900, p. 145.

CHAPTER VII

STONE LAMPS

I discovered 36 stone lamps in excavations in Kamchatka. Some of them were broken. All the types of ancient Kamchadal stone lamps are shown in Plates 14 and 15 and text-figures 64 to 66. They are not remarkable for great diversity as to size and form. I mentioned Aleut lamps[1] longer than 310 mm., and one lamp 1 meter long. There is in the U. S. National Museum at Washington an unusually large stone lamp (No. 90476) from Kodiak Island which weighs 67½ pounds.[2] An Eskimo stone lamp 43 inches long (i. e., somewhat

64. Stone lamp of sandstone.
65. Stone lamp of porphyrite.
66. Stone lamp of andesitic lava, in process of manufacture.
All of Kuril Lake.

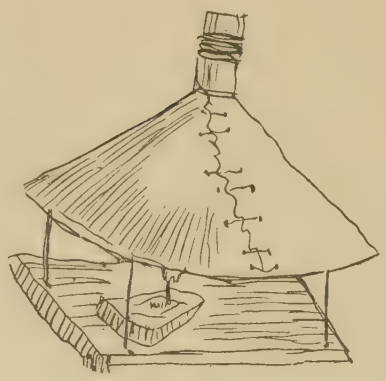
longer than a meter), weighing about 50 pounds is in the American Museum of Natural History of New York. Dr. Stefanson saw several larger lamps, but was unable to purchase them from their owners.[3]

The Kamchadal stone lamps show the following shapes: circular, elliptical, egg-like and sad-iron in outline. No lamps of rectangular form, like those of the Aleut, and clam-shell shaped or crescentic in outline, like those of the Eskimo of Cumberland Gulf or Point Barrow, were excavated in Kamchatka.

Lamp No. 3158 shows the cavity rudely picked out with a hammerstone in the process of manufacture. All the other illustrations of lamps show them in a finished shape and polished. The straight rims of some lamps were chiseled out with hard quartz chisels (see No. 2183). Most of the lamps are flat-bottomed, so they stand without support. The lamp was put on a wooden stand in a somewhat

[1] W. Jochelson, *Archæological Investigations in the Aleutian Islands*, p. 74.
[2] Walter Hough, *The Lamp of the Eskimo*, Annual Report, U. S. National Museum for the year 1897, Washington, 1898, pp. 1027–1057.
[3] See Vilhjamur Stefansson, *My Life with the Eskimo*, New York, 1913, p. 249.

67



68

slanting position (in the sad-iron shape the narrow end was lower) so that the tallow or blubber could run down to the wick from the heat of the flame. The Kamchadal used bear's tallow or seal's blubber, and also fish oil for lighting purposes. The present Kamchadal sometimes still use stone lamps for lighting, but often a tin box, iron frying pan, or a clam-shell substitutes for the stone lamp. In order to be relieved of the sharp odor, smoke and soot of the burning lamp the present Kamchadal put over the lamp a funnel made of birch bark, upside down, the upper tube of which is led outside through the ceiling (see figures 67, 68).[1] The wick consists of a bunch of dry grass, moss or of rag placed at the edge of the slanting lamp. At present the Kamchadal women make wicks of plaited nettle threads. Like the Aleut lamps, the Kamchadal stone lamps had no bridges or special grooves for the wicks, which we find in the Eskimo lamps. The only use of the Kamchadal lamp was for lighting purposes. The Kamchadal did not warm themselves over the lamp, like the Aleut, nor cook like the Eskimo. The Kamchadal had sufficient wood for making a fire when necessary, and their hearths warmed their earth-huts and served for frying meat and cooking vegetables and soups in clay vessels. The lamp was lighted from the hearth, which was usually always burning. The hearth was covered with ashes for the night, so that the smoldering fire might not be extinguished during the night. The fire of the hearth was looked on as the protector of the dwelling, and it was regarded as an unhappy omen should it go out. Once a year, however, at the beginning of winter, the family fire was put out, the hearth cleaned from old ashes, and a new fire started by the drill and sacred fire-board. The burning stone lamps were also extinguished and lighted again from the hearth's new fire.

The Kamchadal lamps were made mostly from hard rock material, usually varieties of quartz. No lamps of soapstone, material in use among the Eskimo, were found in the Kamchatka excavations; neither were any of bone, of which the ancient Aleut made lamps. As the wick was placed by the Kamchadal at the edge of the lamp the borders of a bone lamp would have been burned off by the flame.

The cavity for oil or fat in some Kamchadal lamps represents a flat bottom with straight sides, while in others the bottom is rounded (see Plates 14, 15).

[1] Figures 67 and 68 are taken from Dr. W. N. Tyushov's book: *Along the Western Coast of Kamchatka*, Memoirs of the Imperial Russian Geographical Society on General Geography, vol. XXXVII, No. 2, St. Petersburg, 1906, in Russian, figures 28 (p. 341) and 29 (p. 342).

CHAPTER VIII

POTTERY

METHODS OF COOKING FOOD OF THE ANCIENT KAMCHADAL

At present the Kamchadal do not make clay pots. Until recently the opinion was widespread that they were not familiar with pottery, even in former times. Steller[1] and Krasheninnikoff,[2] in speaking of the ancient Kamchadal method of cooking food, mention only boiling in wooden troughs by means of red-hot stones, and there is nowhere in the writings of these authors a reference to clay vessels. Schrenk[3] considers the absence of pottery among the Kamchadal as proved. He contends also that pottery was unknown to any of the so-called Palæ-Asiatic peoples, with the exception of the Eskimo, whom he classes among them.

We wish to clear up the contradiction between the statements of some travelers, that the old Kamchadal cooked food in wooden troughs by means of red-hot stones and our archæological finds of clay vessels.

Both means of cooking food, by boiling it in wooden troughs and in clay pots, were used. Pottery vessels were used in the permanent winter dwellings, while wooden troughs were used when traveling in winter or moving to fishing places in summer. Clay pots, being light breakable vessels, were not carried along, either by dog-teams or in canoes.

We must admit that Krasheninnikoff and Steller had no chance to observe cooking in clay pots, or to see the Kamchadal pottery, although that may appear improbable, when considering their long stay in Kamchatka and their ample and interesting description of the life of the Kamchadal in all other respects. As to the cooking in wooden troughs, both Krasheninnikoff (I, p. 362; II, pp. 38, 45, 46 and 74) and Steller (p. 322 and App., p. 36) describe in detail how fish and meat of land and sea animals were cooked with edible roots and other vegetables.

R. Torii says that the Sakhalin Ainos made clay pots and at the same time used dug-out trunks for boiling meat and fish in water heated by red-hot stones. He relates the same concerning the Kurilian Ainos. While moving for fishing and hunting purposes from one island to another and not being able to carry with them breakable pottery, they cooked their meals by means of hot stones put in wooden troughs filled with water.[4]

[1] G. W. Steller, *Beschreibung von dem Lande Kamtschatka*, Frankfurt und Leipzig, 1774.

[2] S. P. Krasheninnikoff, *Description of the Land Kamchatka*, vols. I–II, 1819, St. Petersburg (in Russian).

[3] Leopold von Schrenk, *Reisen und Forschungen im Amur-Lande*, Band II, St. Petersburg, 1887, p. 139.

[4] See R. Torii, *Étude Archéologiques et Éthnologiques: Les Aino des Iles Kouriles*, Journal College of Science Imperial University of Tokyo, vol. XLII, Tokyo, 1919–1921 p. 194.

The method of boiling water by means of red-hot stones is known among many peoples—the Eskimo, Polynesians, New Zealanders and others. The Kamchadal of central Kamchatka, says Bogoras (*The Chukchee*, p. 194), even now extract fish-oil by trying out the fish in a dug-out with heated stones. The same was told by Dittmar of the Kamchadal of the village Kluchi on the Kamchatka River (Carl von Dittmar, *Reisen und Auftenthalt in Kamtschatka in den Jahren 1851–1855*, p. 326, St. Petersburg, 1890, Part I). In the work of Dr. Aurel Krause (*Die Tlinkit Indianer, Ergebnisse einer Reise nach der Nordwestküste von Amerika und der Beringstrasse*, Jena, 1885, p. 178) there is an illustration showing how the Tlinkit get fish-oil from the salmon *Thaleichtys pacificus* by boiling it in a dug-out heated with stones. In northern European Russia and Siberia beer is prepared by the same method (see L. S. Berg, *The Discovery of Kamchatka and Bering's Expeditions*, Leningrad and Moscow, 1924, p. 12, in Russian).

REVIEW OF THE RELATION OF THE AINOS TO THE KAMCHADAL

As the Kamchadal pottery is closely connected with and probably adopted from the Ainos, it will be of interest to review the prehistoric and historic relations of the Ainos to the Kamchadal.

As admitted by many anthropologists, the Ainos are of a stock akin to the races of Europe, with some slight Mongolian characteristics adopted in Asia. The route by which the Ainos passed from the west to the east is not known, but probably they are a branch of the dolichocephalic Aryans Din-lin, mentioned in the Chinese annals, who afterward became mixed with Turkish and Mongolian tribes.

About 4,000 years B.C. the whole Japanese archipelago as far north as Yezo was occupied by Ainos. The population was, however, sparse. The Ainos were a genuine continental tribe. They had no boats and, as Torii suggests, crossed the Korean Strait on rafts, from the continent of Asia. There was probably more than one wave of Ainos from the continent. Then Mongoloid invaders came from the continent. The first wave of Tunguso-Mongolic conquerors appeared in Japan between 2000 and 1000 B.C. They forced out the southern Ainos to Yezo. The second wave of Tungus reached Yezo in the fifth or sixth century A.D. They were already partly mixed with Ainos, and these mixed-blooded invaders forced the Yezo Ainos farther to the north, and in their turn the Yezo Ainos forced their kin of the first wave to proceed to the Kurilian Islands. A part of them attained in their migration the southern part of the Sakhalin Island, settled there and continued to make pottery of the primitive type.

After a certain period of peace the Sakhalin Ainos were attacked by a second wave of Ainos coming from Yezo, but in view of the danger of being overpowered by the Orok-Tungus and Gilyak coming from the north, both waves of the Sakhalin Ainos made a common stand and became consolidated.

Those Ainos of Yezo, who did not leave for the Kurilian Islands or Sakhalin and who were not at the same time subdued and mixed with the Mongoloid invaders, took refuge in the mountainous and less favorable localities of the island.

Before the Tunguso-Mongols reached the middle of the Japanese Archipelago, the southern islands (Liu-Kiu and Kiu-Siu), inhabited by Ainos, were attacked by southern invaders of Indonesian origin. Advancing later to the north they met with the resistance of the Tungus and the mixed-blooded Aino-Tungus population, and finally entered as a third element in the ethnic compound of the Japanese nation. A certain infusion of Chinese blood may also be mentioned.

This somatological amalgamation of the Japanese people is shown in the results of the anthropological work by Professor Matsumura when observed by provinces. Although he measured a selected class of the Japanese population, students (males and females) of universities and normal schools, nevertheless we see that, in provinces where the Aino element may be supposed to lead, the dolichocephalic index and a lower stature predominate.[1]

[1] Akira Matsumura, *On the Cephalic Index and Stature of the Japanese and their Local Difference: A Contribution to the Physical Anthropology of Japan*, Anthropology Institute, Tokyo Imperial University, Tokyo, 1925.

We have said before that the Ainos were not acquainted with navigation, coming to the islands on rafts. Later they learned to build clumsy boats from the Japanese—not from the Indonesians, who are expert navigators; neither did they adopt the skin boat from the Chukchee and Koryak. As to shape, their dug-outs and boats do not resemble the canoes of the Kamchadal.

Figures 69–74 show objects found in 1899 by Dr. Torii in a neolithic site on the island Shumashir.
Fig. 69. Fragment of a bone comb ornamented with interwoven curves, reminding one of the decoration of the Kamchadal bone belt buckle of Plate 16, figure 8.
Fig. 70. Bone comb resembling the Kamchadal comb of Plate 16, figure 9. I am inclined to regard them both as implements for making decorative paralel lines when the clay is still wet. It may be that they served both objects: as hair combs and implements for decoration of pottery.
Fig. 71. Fragment of a bone comb with broken-off teeth.
Fig. 72. Half of bone belt buckle. The decorating interwoven curves are much larger than on the preceding buckles, both Kamchadal and Kurilian. Five drilled holes along the broken edge were intended, as it seems, to bind together the two broken halves.
Fig. 73. Bone buckle of smaller size, ornamented by irregular circles and straight lines.
Fig. 74. Bone case for fishing hooks.

While the Ainos had adopted nothing from the East-Siberian tribes as far as concerns navigation, they made some cultural acquisitions from the Kamchadal or were influenced by them in some respects. The Kurilians weave grass baskets of the same kind and material and in the same manner as the Kamchadal do. The same is true of wooden utensils. On the other hand the Kamchadal adopted from the Kurilians the mode of manufacture of bone combs, belt buckles and ornamental motives. The Aino as well as the Kamchadal women use the head-band for carrying children on the back.

Some Kamchadal and Kurilian objects and their decorations are shown for the purpose of comparison. Plate 16 shows objects found by the author while digging on the shores of the Kuril Lake (see description of this plate).

According to Torii (*Les Ainou des Iles Kouriles*, p. 277) the wooden combs of the present Aino-women resemble very much the bone comb shown in figure 69. Chamberlain says (*Things Japanese*, p. 33) that ornamentations on pottery were made by the Ainos with a wooden comb, stamp or pointed stick. This is just the same as I concluded concerning the combs and other instruments illustrated on Plate 16.

To return to the proper subject of this chapter, the pottery. According to the investigations of Torii, the Kurilian women of the island Shikotan manufactured pots, jars, saucepans and plates from clay tempered with sand and chopped grass as late as the last century. About three generations ago they abandoned pottery making, using Japanese and Russian iron vessels of every kind.

Torii investigated numerous neolithic sites on the Shumushur and Paramushir Islands, and everywhere he found remains of pottery of the same primitive kind, which was in use the last time among the northern Kurilians. On the contrary, the Kurilians of the second wave left on the southern islands, Kunashiri and Iturup, remains of pottery of greater perfection. In the same period the Ainos of the second wave who remained in Yezo abandoned the manufacture of pottery, getting all kinds of wooden and iron vessels from Japan.

That part of the Ainos who were forced out from Yezo by the second wave of Japanese Ainos and went to the island Sakhalin, instead of the Kurilian Islands, continued to manufacture their primitive pottery. The second wave of Ainos who came to Sakhalin from Yezo brought with them metal vessels. The first wave being assimilated with them ceased to manufacture pottery, except vessels necessary for religious ceremonies. We know that practices connected with the cult persist everywhere long after they have been eliminated in ordinary life. The remains of this ceremonial pottery are identical with the remains of pottery of the Kurilian manufacture.

According to Mamiya Rindzo, the Sakhalin Ainos on the shore obtained iron kettles and pans from Japan and those from the interior got theirs from Tungus.[1]

POTTERY OF THE AINOS

The Ainos of Yezo and the Kurilians, according to Munro, were not supposed to be conversant with pottery until R. Torii in 1899 found that the Kurilian Ainos not only had used, but recently had made pottery of a coarse description.[2]

Dittmar found "small clay vessels" of most primitive workmanship. "The clay crumbled under the hands, it had evidently been badly (if at all) baked," says Dittmar. As the pots were saturated with blubber, he thinks it possible

[1] R. Torii, *Études Archéologiques et Ethnologiques: Les Ainou des Iles Kouriles.*, Journal College of Science, Imperial University of Tokyo, 1919–1921, pp. 188–191.

[2] N. G. Munro, *Prehistoric Japan*, Yokohama, 1911, p. 195.

that they had been lamps, and not cooking pots; but this opinion may be offset by the shape, size and, especially, the depth of the pots found.[1]

Witsen, based on information received from cossacks, stated that the Kamchadal used clay vessels.[2] The Cossack Atlassov,[3] mentioned above, says in his report to the Government that the Kamchadal made pottery in his time.[4]

We see that before our excavations there were some indications as to the former pottery-making of the Kamchadal, but these were somewhat vague. Our diggings furnished more definite data concerning the Kamchadal types and methods of manufacturing pottery. We discovered two kinds of coarse clay vessels—with handles inside and with holes near the upper rim of the pots—and a kind of more elaborate ceramics with outer ornamental designs.

POTS OR PANS WITH EARS INSIDE

Fragments of pottery with handles inside were found by the writer in many diggings of the central and southern parts of Kamchatka, and he was fortunate to discover one complete pot in a pit on the shores of the Nalacheva Lake and another on the Nalacheva Cape (see Plate 17, figs. 1, 3). We may say that not only the wheel was unknown to the Kamchadal manufacturer of this rude kind of pottery, but neither the coil method nor the basket modeling process was applied by him, though there remained some impressions of basketry on the outer side. It seems that the vessels were worked out from single blocks of clay and beaten into shape. It is the crudest pottery. The dimensions of figure 1 have been given before (see p. 48). The thickness is about a third of an inch. It is difficult to say whether this kind of pottery was especially burnt before being used or was baked by the fire while cooking. The fact that these vessels remained intact after having been long buried under the ground proves that they were solidly made and water-tight. Being smeared with fat and blackened by smoke, they received a coating against water, which may be compared with the glaze of higher types of pottery. To make the clay more resistent it was tempered with sand, gravel and the hair of sables' tails.[5] The Cossack Atlassov, when presenting to the Government the tribute of the Kamchadal in sable-skins, delivered many of them without tails. In apologizing he said that the Kamchadal make boas of sables' tails and used the hair for tempering clay.

There is no doubt that the inside ears were intended for suspending the pot over the fire, as they afforded better protection to the suspending cord or thong than those outside the pan.

[1] Carl von Dittmar, *Reisen und Aufenthalt in Kamchatka in den Jahren 1851–1855*, St. Petersburg, Part I, p. 213. Dittmar gives the following measurements of a pot: upper diameter, 12 cm.; lower diameter, 10 cm.; maximum width, 14 cm.; depth, 10 cm. This vessel, therefore, had an aperture smaller in diameter than the middle part, and its bottom was still smaller than the aperture. Clay lamps are of a quite different shape, as shown by Bogoras, Nelson and other explorers of the northern regions.

[2] Nicolaas Witsen, *Noord en Oost Tartarye*, Amsterdam, vols. I–II, 2d ed., 1705, p. 673 (1st ed., 1692).

[3] See before p. 1.

[4] See G. Spassky, *Vladimir Atlassov the Conqueror of Kamchatka*, Jour. Imperial Russian Geographical Society, 1858, vol. XXIV, p. 164 (in Russian).

[5] Munro (*Prehistoric Japan*, p. 196) supposes that grass was mixed by the Kurilians in their primitive pottery, the clay of which became black, due to the carbonization of the grass. R. Torii (*Les Ainou des Iles Kouriles*, p. 188), referring to information received from old Kurilian people, says that the ancient Kurilian Ainos tempered clay for pottery with sand and minced grass called "nokkanki."

We have referred to Mr. Torii who found that the Kurilian Ainos used this kind of pottery. Mr. Mamiya Rinzo displayed a clay pan with handles inside from Yezo.[1] Mr. S. Suzuki has also shown a clay pan of rough make with the handles inside from Sakhalin Island.

The question arises as to where we may look for the place of origin of this kind of pottery: in Kamchatka or Japan. Pottery in general needs a sedentary life for its proper development. The same may be said of the primitive pottery

Fragments of ancient Kurilian pottery.

in question. It could develop among the original settlers of Japan, the Ainos, and spread to the north, to Sakhalin, Kurilian Islands and Kamchatka. The sedentary or semi-sedentary fishers of Kamchatka might have adopted it from the Kurilians.

According to Mr. N. Tanaka, "within the last 20 years earthenware pans with handles inside were in use in Musashi and the island of Hachijo."[2]

Illustrations of the following fragments of ancient Kurilian pottery are taken from R. Torii's work (*Les Ainou des Iles Kouriles*, Plate XXXIII). Figures 75 and 76 show fragments of Kurilian pottery with inside ears. Figure 77 shows a

[1] The Japanese investigator Mamiya Rinzo spent the years 1804–1817 in Sakhalin.

[2] See Munro, *Prehistoric Japan*, Yokohama, 1911, p. 196. Cited from Tokyo Jinruigaku (Tokyo Anthropological Magazine), No. 16, 1887.

fragment of the lower part and the flat bottom of a clay vessel. Figure 78 represents a fragment of a clay vessel with a drilled hole for tying it by a cord to the hole of another broken piece of the vessel. In figure 79, Torii gives an outline of a clay pan with two ears inside. It is not clear whether there was a third ear, like that in the Kamchadal clay pots.

Figure 80 shows a fragment of ancient Aino pottery with an ear inside, found, according to Torii, in Sapporo on Yezo. It is shown one-third natural size. Figure 81 represents a clay vessel of ancient pottery with ears inside found in Esashi, Yezo; two-ninths natural size. This drawing is taken from an article by the late Professor S. Tsuboi in the Bulletin of the Tokyo Anthropological Society (vol. IV, No. 37, March 1889, p. 227). This vessel has only two inside ears. A rough sketch of a Sakhalin clay pot with ears inside is shown by Mr. Suzuki in his work, *Karafuto Nikki*.[1] Like figure 81 this vessel also has only two ears.

Iron cooking vessels.

According to Torii (*Les Ainou des Iles Kouriles*, p. 279) fragments of pottery with ears inside the pots were found also in Japan, i. e., on the Nippon Island. Thus we see that the manufacture of this kind of primitive pottery was not limited to the Kurilian Islands and Sakhalin only. It spread all over Japan—over localities formerly inhabited by Ainos. But from nowhere, except in Kamchatka, were clay vessels with three inside handles reported.

Figure 82 shows a sketch of an iron pan from Sakhalin with ears inside the vessel. The illustration was published by Torii (*Les Ainou des Iles Kouriles*, p. 195). Figure 83 shows a drawing of an iron pot with loops on the inside surface. It is from a photograph of a piece in the Museum of the Imperial University in Tokyo, kindly forwarded to me by Professor Akira Matsumura. The cord is covered with birch bark in order to protect it from the heat of the boiling pot. It must be noted that the iron pots (figs. 82–83) have only two inside ears like the

[1] Suzuki traveled in Karafuto (Sakhalin) Island in 1853. See *Karafuto Nikki*, Shigehisa Suzuki, With Notes and Addenda by Takeshiro Matsuura, 2 vols., Tokyo, 1860.

Aino clay pots referred to above.[1] Such iron pots, says Munro, have been found in the pits of Hokkaido (Yezo) with wares of wood and implements of stone.[2] The Yezo Ainos, he says in another place, have long been accustomed to use iron pots from Japan or Siberia, some of which had handles inside, and it is reasonable to suppose that the clay pan with handles inside was copied from the useful iron model. I wish to add to this statement that nowhere in Siberia have I seen iron pots with handles inside, and there is no doubt that such iron pots were made in Japan and copied from the more primitive model, the clay pot, and not the reverse.[3]

Plate 17, figure 2, shows the upper part of a clay pot, the three fragments of which I cemented together and which had no handles. The height of the pot and the shape of the bottom, whether flat or conical, are unknown. As this pot has no handles or holes for suspension, one may suppose that the bottom was flat, intended to rest amid the burning logs and in the ashes of the primitive hearth, which was the ground and sometimes had an enclosure of stones to confine the fire. This pot looks somewhat smoother than the pans with handles inside and its rim is decorated with four parallel lines. It was probably deeper than the shallow pans, but it was made of the same coarse clay and not subjected to a special burning. The decorative lines were made when the clay was still wet, by a bone instrument like that shown on Plate 16, figure 10. Fragments of upper parts of clay pots with decorative parallel lines are shown on Plate 18, figure 2.

A DIFFERENT KIND OF POTTERY TO THE NORTH OF KAMCHATKA

Fragments of a different kind of clay pots were found by the author in the excavations of northern Kamchatka. Plate 19, figure 1, shows pottery fragments of the Kulki site and figure 2 of the Kavran site. The majority of these fragments seems to be from small vessels, the clay to be burnt, and the pots more decorated than those of southern Kamchatka. In some cases impressions of baskets or ropes may be seen, but most of the decorations, consisting of dots, lines, zigzags and other figures, were made by the hand by means of bone or wooden implements. Holes were found in many of the pottery fragments. The holes were made differently for particular purposes; those near the upper rim were made by an awl, when the clay was still wet, and intended to serve as loops for cords or thongs for suspension over the hearth. Other holes were made by a drill in order to mend broken pieces by tying them with sinew threads and smearing over the broken lines with clay. On Plate 19, figure 1, are shown both kinds of holes on two fragments. Going farther to the north we may point to a restored clay pot, from fragments found by the writer while digging an old Koryak site. The mouth of the pot had a diameter of about 27 cm., its height must have been approximately 27 cm., and the walls were 4 to 8 mm. thick. All potsherds found in the Koryak[4] territory are quite thin, so that their manufacture had little in

[1] It must be noted that the iron pot in figure 82 has, besides inside loops, three feet evidently for putting the vessel on a table or bottom for eating.

[2] Cited from Professor Tsuboi, Tokyo Anthropological Magazine, No. 16, June 1887.

[3] The Siberian iron and copper pots and kettles, manufactured chiefly in European Russia, have handles outside the vessels or on their upper rims.

[4] See the author's work, *The Koryak*, p. 640, fig. 165.

common with that of the thick and clumsy clay lamps and unbaked quadrangular kettles of the modern Chukchee and Asiatic Eskimo. The potsherds found in the Koryak excavations were black from soot and fat, and were evidently well baked, as they remained strong and hard, although they had been lying in the wet soil. All these potsherds were made of coarse clay containing fine gravel and pieces of quartz. The Koryak pot referred to above was molded by hand, and all over the outside are the impressions of closely woven, twined basketry. Evidently this impression was made by taking a piece of twined fabric in one hand and pressing it against the moist pot, the twined woof being placed so that the lines ran at right angles to the rim. The pot had a conical bottom and it is possible that it was intended to be supported by stones or to rest in a cavity of the hearth.[1]

Proceeding farther to the north we find among the Chukchee and the Asiatic Eskimo a pottery somewhat like that of the Alaskan Eskimo. Their elongated rectangular form is adapted to the shape of the lamp over which it is hung in cooking. It may be that this form of pottery came to Alaska from Asia. Some clay kettles of the same shape from St. Lawrence Island are among the collections of the U. S. National Museum of Washington.

[1] We have seen before (p. 30) that neolithic sites in the Baikal Region yielded clay pots with a conical bottom which were supported on the hearth by stones. Professor Petri contends that pottery with flat bottoms appeared chiefly in the iron age. The pot with a conical bottom found by the author in a site of the Koryak territory may support Petri's supposition. On the other hand a fragment of a clay pot with a flat bottom from a neolithic site of the Ainos is shown in figure 77.

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Abbo, excavations of, 42
Administrative divisions and geography, 16
Afontova Mountain, 23
Africa, iron from, 40
Agapitoff, N. N., discovers neolithic relics, 27
Aino clay pots, 76
Kamchadal pottery, 30
Kurilian, in Japanese trade, 37
pottery, 75
women, wooden combs of, 72
Ainos, 32, 35
boats of, 71
Kurilian, 74
Northern, 19
of Yezo, 37
relation of, to Kamchadal, 70
Alaid Island, tradition on, 63
Alans, bronze culture of, 39
Alaska, 15
Eskimo women's knives, 53
Aleut, fish hooks of, 29
lamps, 67, 68
Aleutian Islands, V, 6
excavations on, 42
implements of, 41
Japanese shipwrecks at, 10
Altai, 32
metals of, 39
stone artifacts of, 33
Alutor River, 2, 10
Alutorsk, settlement built, 2
Amanino, dialect of, 16
village, 16
America, connected with Asia, 3
immigration from, 16
American Museum of Natural History, V, VI, 67
Americanoids, 16
Americans, inhabitants of Kamchatka, 16
Amur River, 1
canneries on, 58
neolithic site, 28
shellmounds of, 34
Anadyr, 11
River, 1, 5, 10
Anadyrsk, 1, 2, 10, 16
Anau 1, neolithic sites of, 35
Anderson, J. G., on neolithic industry, 34
Andrews, R. C., 25
Angara, climate of, 36
River, neolithic bones from, 31
neolithic finds, 27
neolithic grave at, 32
palæolithic sites, 25
Valley, palæolithic finds, 24
Animals, domesticated of Kamchatka, 17
Anna Ioanovna, Empress, 10
Anthropological Society of Tokyo, 75
Anthropology, 75
Antillean islanders, clay used as food, 66
Antreyevsky Lake, neolithic dwellings at, 31
neolithic finds, 26
Antzyferoff, Chief, 11
Arctic Ocean, 1
Russian navigators in the, 6
Arkhangelsk, 5
Artifacts discovered, 47
in Angara Valley, 24
in Yenisei Valley, 24
Aryans Din-lin, 70
Asia, connected with America, 2
Northern, 3
osteological remains in, 32
Asiatic Expedition to Gobi, 33
Assyria, bronze culture of, 39
Atlassov, the Cossack, on pottery, 73
visited Kamchatka, 1
Aurignacian Epoch, 24
Avacha Bay, 5, 6, 9, 42
excavations at, 41
Kamchadal, tribute from, 11
Azilian epoch, 25, 29
Baikal Lake, ceramics of, 30
iron objects from, 39
neolithic dwellings at, 31
neolithic people of, 65
neolithic relics of, 32
neolithic site, 27; 28
Region, 77
Balagansk District, neolithic finds, 27
Barthold, W. W., Prof., 10
Bashirov, P. N., VI
Beresov district, neolithic finds, 26
Berg, L. S., Professor, 3, 6, 7, 8, 69
Bergman, Sten, 21
Bering, Vitus, 4, 8
Expeditions, 2, 4
Sea, 1, 2, 47, 48
Strait, 1, 7, 15
Bii River, 24
Biisk, 24
neolithic finds, 26
Billings, Joseph, 7
Bishop, Carl Whitting, on neolithic man, 35
Bison priscus, 15
Block house, Russian, 63
Bogatyrevskaya Bay, excavations at, 41
Bogdanovich, Karl, 15
Bogoras, Waldemar, on Japanese trading, 37
on the reindeer Chukchee, 66
Bolshaya Reka, dialect of, 16
Bolsheretsk, attacked, 10, 11, 57
Bone industry, 31
Boris Godunoff, Czar, 12
Boule, M., on polished stone, 34
Bowers, St., author, 29
Broca, 20
Bronze culture, 38
Burney, James, 7
Buryat huts, 65
Byalynitzky-Birula, A. A., on climate, 36
California Indians, fish hooks of, 29
Cape North, 7
Carib islanders, clay used as food, 66
Carnegie Museum of Pittsburgh, 7, 15
Carolinas, clay used as food, 66
Catherine I, 4
Catherine II, abolished caravans to Peking, 12
Cattle breeding, 38
Ceramics, Siberian, 30
Chamberlain, Basil Hall, 40
on pottery, 72
Chardin, Teilhard de, 25
Chekanovsky, A., 24
Chersky, I. D., 24
Chichagov island, 6
China, ancient, bronze culture of, 39

China, iron workers of, 40
Northern, palæolithic finds, 33
old man of, 25
Chinese annals, 70
inhabitants of Kamchatka, 16
Chirikov, Alexei, with expedition to Kamchatka, 4, 5
Christianity of Kamchadal, 20
Siberia, 35
Chuds, dolichocephalic, 32
Chukchee, 16
boats, 71
huts, 65
in Japanese trade, 37
kettles of modern, 77
Peninsula, 15
reindeer, 66
Chukotski Expedition, 7, 16
Clay, pots and pans, 69, 74, 76
Climate of Kamchatka, 18
Coins, Japanese, 56, 62
Company Land, 8
Cook, James, 7
Cooking vessels, 73, 75
Cossack chiefs, cause uprising, 10
Cossacks, 11
Cows of Kamchatka, 17
Crimean war, military camp of, 43
Cumberland Gulf, stone lamps of, 67
Dall, W. H., on excavations, 42
Damian Pomortzev (Gonza), 10
sent to Russia, 9
de Chardin, Teilhard, 25
Delisle, Louis, de la Croyère, 5, 6
Denbei, taken prisoner, 9
Denmark, shellmounds of, 34
Dershavin, zoologist, 63
Deshneff Cape, 7
Deshnev, Cossack, founded Anadyrsk, 1
Dialects of Kamchatka, 16
Dinlins, 32
Dittmar, Carl von, on clay vessels, 69, 72, 73
on traditions, 63
Dogs of Kamchatka, 17
Domestic animals, 17
Dudinskoye, neolithic finds, 26
Dune dwellers, 25
Dwellings of neolithic period, 31
East Cape, 7
East-Siberian tribes, navigation by, 71
Elizabeth, Empress, 12
Esashi, pottery, 69, 75
Eskimo, Alaskan, pottery of, 77
Asiatic, kettles of modern, 77
lamps, 41, 61, 68
metal used by, 40
Etamenk River, 60
Ethnological Division of the Kamchatka Expedition, V
Europe, bronze age in, 38
metals in, 37
neolithic dugouts of, 30
reindeer age, 27
western, 25
neolithic industry of, 29
European influence, on bronze period, 39
inhabitants of Kamchatka, 16
Excavations, localities where made, 41
Far East, Russian Government in, 1
Fisher, G. W., 5
Flint, use of, 41
Fominskoye, palæolithic stratum at, 24
French explorers in Mongolia, 33
Fur tribute, or Yassak, 12, 13
Gabriel, 10, 11
Gama Land, 5, 8
Gapanovich, I. I., 21
Geographical Society, V
Geography and administrative divisions, 16
Georgia, clay used as food, 66
Gilyak, 66, 70
Gishiginsk, 16
Glaskovo, neolithic graveyards at, 31
Gmelin, Johann, 5
Gobi Desert, neolithic finds at, 33
Godunoff Boris, Czar, 12
Golder, F. A., 2
Golyghino, inhabitants of, 19
Gorostchenko, anthropologist, 32
Goryunova, Madame E. I., VI
Gower, C. D., 66
Granger, Walter, neolithic finds by, 33
Great River, dialect of region of, 16
Greenland, iron in, 40
Gschnitz period, 36
Guerye, Vladimir, 3
Guiana Indians, clay used as food, 66
Hachijo Island, earthenware pans used in, 74
Hanover, library of, 3
Health of Kamchadal, 20
Heye, I. I., author, 29
History of Kamchadal, 1
Hokkaido, pits of, 76
Honan, neolithic station, 34
Horses of Kamchatka, 17
Hough, Walter, 67
Hundji, 57
Hungarian influence, on bronze period, 39
Huns, 32, 39
Indians, California, fish hooks of, 29
Indighirka, 2
Indonesians, boats of, 71
Interglacial Epochs, 15
Iranian people, bronze culture of, 39
Irkutsk, 24
neolithic graveyards near, 31
neolithics relics, 27
Iron age of Siberia, 39
cooking vessels, 75
Ishim River, neolithic finds, 26
Iturup Island, neolithic sites on, 72
Japan, 34
bronze age in, 40
clay pots from, 74
friendly relations with Russians, 7
neolithic man in, 35
pots from, 75, 76
Japanese at Osernaya, 57
boats, 71
coins, 56, 62
culture, 64
fishermen, 59
Government, prohibits navigation, 37
inhabitants of Kamchatka, 16
iron vessels, 72
language taught to Russians, 10
ordered killed, 11
shipwrecks near Kamchatka shore, 9
Jesuit explorers, French, 25
Jochelson, Mrs., 59
measurements of Kamchadals by, 19
Jokhol, neolithic finds at, 33

Kalgan, pottery found at, 33
Kamchadal, canoes of, 71
chiefs, 11
clay pots, 75
country and somatology of, 15
decorations, 72
dog sledge, 51, 52
dwelling, 65, 66
economic organization of, 21
fish hooks of, 29
fishermen, 59
fishers, food of, 42
fishing season, 17
geological past, 15
hammered metal, 64
implements of, 41
laborers, 43
lamps, 68
language, 16
measurements of, 20
methods of cooking, 69
pottery, 70, 73
psychology of, 12
somatology of, 19
take Japanese prisoners, 9
uprising of, 10
use of metals by, 37
Kamchatka, 8, 11, 56, 57
agriculture of, 18
clay as food, 66
clay vessels, 74, 75
climate of, 19
conquest of begun, 1
domestic animals, 17
excavations, 23, 41, 68
Expedition, publications on, V
health of, 21
Japanese works on shores of, 9
metallic artifacts, 64
metals in prehistoric, 37
military camp, 43
Peninsula, map of, 14
peopling of, 16
population of, 65
pottery from, 73, 76
reindeer, 17
River, 11
sables of, 13
sanitary conditions of, 20
shore of, 15
stone lamps of, 67
tradition on, 63
Valley, 51
Kansk, neolithic finds, 26
River, neolithic finds at, 27
Kara Sea, neolithic finds, 26, 35
Karagas, tribe, 31
Karsky tundra, 35
Kasimeroff, pilot, 7
Kastchenko, N. F., 23
Katun River, 24
Kavran artifacts found, 52, 54, 55, 56
River, excavations at, 41
human bones found at, 20
pits on, 51, 65
site, pottery from, 56, 76
Kayak Island, 6
Kerensky, A., abolished fur tribute of Siberians, 13
Khalakhtyrka Village, 44, 45
River, 44
Khalakhtyrka Lake, 44
Kharyusovo, blind people of, 20
Khoroshikh, P. P., finds neolithic relics, 28
Kirensk district, neolithic site, 27
Kirghiz-Kaisak, 32
Kitchen middens, 33, 34
Kitoi River, neolithic graveyards at, 31
Kiu-Siu Islands, 70
Klementz, D. A., on bronze age, 38, 39
Kluchevskoye, climate of, 18, 19
vegetables of, 18
Kodiak Islands, 6
stone lamps of, 67
Koluchin Island, 7
Kolyma River, 1, 4, 7
Komandor Islands, 16
Komarov, V. L., V
Konradi, S. A., on Kamchatka volcanoes, V
Kopytoff, M. D., 24, 26
Korea, 34
iron workers of, 40
Korean Strait, 70
Koreans, inhabitants of Kamchatka, 16
Koryak, 16, 51
boats, 71
clay as food, 66
excavations, 77
huts, 65
in Japanese trade, 37
inhabitants of Kamchatka, 16
site, pottery from, 76
tribute imposed on, 1
Koshevnikoff, N. J., 7
Kosma Shultz (Soza), 10
Kosogol Lake, neolithic sites at, 32, 33
Kozmin, N. M., finds neolithic site, 27
Krasheninnikoff, S. P., 5, 12, 16, 64
on cooking, 69, 70
on pit dwellings, 65, 66
Krasilnikoff, Andrei, 5
Krasnoyarsk, 23, 24
neolithic burials near, 32
Krause, A., 69
Krijanovsky, N. N., VI
Kronotzkoye Lake, tradition on, 63
Kulki, fort, 51
River, 56
climate of, 19
excavations at, 41
pits on, 50, 65
site, pottery from, 76
Kunashiri Island, neolithic sites on, 72
Kuril Lake, 56, 63, 64
bears on, 59
excavations at, 41, 60
implements, 55
pits near, 65
specimens from, 61, 62, 72
stone lamps of, 67
Kurilian Ainos, clay pots of, 69
decorations, 72
Islands, 70
charted, 8
neolithic sites of, 35
pottery of, 72, 75
tradition, 63
Kurilians, use of metals by, 37
weave grass baskets, 71
words, 16
Lamps, stone, 67

Lamut, clay as food, 66
Lao-Khe River, palæolithic finds, 33
Leibnitz, note to Peter I, 3
Lena River, 1, 5
neolithic site, 27
Lesseps, M. de, 10
Licent, F., 25
Linkov, A. J., finds neolithic station, 27
Little White Lake, 25
Liu-Kiu Islands, 70
Lopatka, 9
Cape, 16
Lushan, Felix von, 40
MacCurdy, G. G., on bronze age, 40
on excavations, 42
Magdalenian period, 24, 36
Mammoth, remains found of, 15
Manchuria, excavations in, 42
neolithic finds in, 35
shellmounds of, 34
Manchus, iron workers, 40
Margaritoff, V., finds neolithic relics, 28
Matsumura, Akira, 70, 75
Meadow-sweet, 45
Mekhlin, Major, 11
Mental traits of old Kamchadal, 11
Menton, France, excavations at, 42
Merhart, G. von, 23
Metals in prehistoric Kamchatka, 37
Meteorological Division, 18
Miller, Herard, 5
Minusinsk, 24
bronze industry of, 38
Museum, bronze objects in, 39
neolithic finds in, 26
Miocene Epoch of Kamchatka, 15
Mio-Pliocene Epochs of Kamchatka, 15
Mongolia, iron workers of, 40
neolithic stations, 26
northern, 32
palæolithic remains in inner, 25
pottery of, 34
the inner, neolithic relics of, 33
Mongoloid invaders, 35, 70
Mongols, iron workers, 40
Morozko, Cossack, sent to Kamchatka, 1
Moscow, fur tribute sent to, 12
Mousterian scrapers, 24, 25
Mukhor Bay, neolithic site, 27
Müller, G. F., 7
Munro, on pots, 72, 76
Musashi, earthenware pans used in, 74
Nadezhda, 7
Nalacheva Cape, excavations at, 41, 46, 47, 48
Lake, 56
excavations at, 44
pits near, 65
pots or pans from, 73
River, excavations near, 45
Nalghinsk Mountains, 2
Naridata, Hundzi, 55
Navigation, 71
Neanderthal man, 25
Nelson, N. C., 25
neolithic finds at Gobi, 33
Neolith, The Siberian, 25
Neolithic culture of the far north, 35
Siberia, 39
finds of Gobi desert, 33
man, skeletal remains in Siberia, 31
Neolithic period of Western Europe, 31
in Siberia, 38
sites, 27, 28, 35
near Siberia, 32
Nephrite, 30
Nets, thong, 17
Nippon, 7
Island, pots of, 75
Nishne-Kamchatsk, 10
Nordenskiold, 40
Nordics, of Northern Europe, 32
Novitzky, W. M., 26
Ob region, palæolithic station, 24, 25
Ob River, Neolithic finds, 26
Obdorsk, neolithic finds, 26
Obruchev, W. A., 15
Okhotsk, 2, 16, 58
Sea, 1, 10, 56, 63
cold of, 18
neolithic site, 28
salmon in, 61
Oklan River, 2
Oklansk, 2
Olekma River, neolithic site, 27
Olkhon country, neolithic sites in, 28
Opala River, 9
Orok-Tungus, 70
Osaka, 9
Osernaya, 57
River, 16, 55, 56, 59, 60, 61, 63
excavations at, 41
pits on, 65
Ostrovskikh, on iron manufacture, 39
Ostyak people, 35
Ovchinnikov, M. P., 24, 27
discovers neolithic graveyards near Irkutsk, 31
on iron manufacture, 39
Ovifak, iron in, 40
Pacific coast, neolithic finds, 26
Ocean, 18
Palæ-Asiatic peoples, cooking by, 69
Palæolith, the Siberian, 23
Palæolithic finds, 24
in Mongolia, 25
man, 25
remains in inner Mongolia, 25
Palan, excavations at, 50
pottery from, 61
Paramushir Island, neolithic sites on, 35, 72
tradition on, 63
Paratunka River, 42
village, 42
Paren River, 10
Patkanoff, S. A., investigator of Siberia, 21
Patkha River, neolithic site, 28
Pavlutzky, Major, 10, 11
Pechenyegs, 32
Peking, caravans to, 12
Penshina Bay, 1
River, 2
Peoples of Asiatic Russia, Handbook, V
Peredolsky, V. V., 26
finds neolithic graves, 32
Perfilyev, Boris, 49
Pestchana Bay, neolithic site, 27
Peter I, interest in Kamchata, 2
instructions for Bering expedition, 4
Petri, B. E., 23, 31, 65, 77
ceramic finds by, 30

Petri, B. E., discovers neolithic relics, 27, 28, 29, 31, 32
excavations near Irkutsk, 24
on bronze age, 38
on iron manufacture, 39
Petrograd, Academy of Sciences in, 23
Petropavlovsk, 11, 44, 45, 56, 60, 63, 64
climate of, 18, 19
excavations at, 41
made capital, 16
specimens from, 62
Pleistocene Age, 33
epoch of Kamchatka, 15
period, 29
Pliocene epoch of Kamchatka, 15
Point Barrow, stone lamps of, 67
Poliakoff, I. S., 26
Polovtzy, 32
Popoff, Simeon, 5
Population of Kamchatka, 65
Porcelain cup, Japanese, 53
Port Arthur, shellmounds of, 34
Pots or pans with ears inside, 73
Pottery, 69, 70, 71, 72
of Ainos, 72
of Aino-Kamchadal, 30
of Kamchadal, 69
of Kurilians, 74
of north of Kamchatka, 76
Primorskaya Province, 16
Pumpelly, Raphael, explorations in Turkestan, 35
Puxov, Dr., on health of Kamchadal, 20
Quaternary Period in Kamchatka, 15
Radloff, W. W., on Siberian bronze age, 38
Rasava Island, fairs on, 37
Rasputino, neolithic finds, 27
neolithic grave at, 32
Riaboushinsky, F. P., V
Expedition of, 18, 63
Rindzo, Mamiya, on iron kettles, 72, 74
Rivière, Emile, on excavations, 42
Rostovtzeff, Prof., on bronze culture, 39
Roth, W. E., 66
Rudenko, S. I., 26
Russia, Japanese prisoners sent to, 9
kurgan builders of, 32
neolithic dugouts of, 30
Southern, bronze culture of, 39
Russian Academy of Sciences, V, 5, 23
block houses, 64
Government, introduced agriculture, 18
houses, 57
Imperial Geographical Society, V
inhabitants of Kamchatka, 16
invasion, 37
iron vessels, 72
-Japanese War, 21, 56, 57
settlers, 19
Russianization of the Kamchadal, 12
Sable as tribute, 1, 13
Sacæ, 32
Sacians, bronze culture of, 39
Sahara, no bronze age south of, 40
Sakhalin Ainos, clay pots of, 69
clay pot, 75
Island, pottery of, 70, 72, 74
Salmon factories, 58
Salt Lake, excavations at, 41, 42
Samarovskoye, neolithic finds, 26
Samoyeds, 35
Sanime, 9
Sanitary conditions among Kamchadal, 20
Sapporo, pottery from, 75
Sarmatians, bronze culture of, 39
Sarycheff, Gavriil, 7
Satzuma, 9
Savenkov, I. T., 23, 26
finds neolithic graves, 32
Savoiko village, excavations at, 41
pits at, 43
Schmidt, P. J., V, 63
Schrenk, Leopold von, 69
Scythian area, bronze culture of, 39
Scythians, 32
Sea bears, 1
Sea lions, 17
Sea otters, 1
Second Tribute Commission, 13
Sedanka, dialect of, 16
Shaba, Ensign, 57
Shabarakh Usu, 25
Shaphiroff, Baron, 3
Shelagski Cape, 7
Sheldon, W., 66
Shellmounds, 33, 34
Shestakoff, Afanassy, 10, 11
Shikotan manufactured pots, jars, etc., 72
Shirokogoroff, S. M., finds neolithic deposits, 28
on health of Kamchadal, 20
Shogunate, 8
Shoguns, restrictive legislation of, 9
Shukov, B. S., VI
Shumagin islands, 6
Shumashir Island, neolithic site, 35, 71, 72
Sira-Murem River, palæolithic finds, 33
Siberia, V, 5, 7, 15
age of metals in, 38
ceramics of, 30
Chuds of, 32
clay as food, 66
climate during neolithic period, 35
dwellings of neolithic period, 31
economic organization of, 21
iron age of, 39
iron workers of, 40
metals in, 37
neolithic stone industry of, 29
palæolithic dwellers of, 24
palæolithic man of, 25
pots from, 76
Russian conquerors of, 1
Russians attracted to, 12
stone age in, 23, 26
stone industry of, 29
Siberian Americanoids, 15, 16
continent, winter of, 18
natives, fur tribute abolished, 13
neolithic characteristics, 28
neolithic pottery, 30
Siem-Pi, iron workers, 40
Siwusk Cape, excavations at, 41, 59, 60
Slovtzov, J. G., neolithic dwellings found by, 26, 31
Small Patom River, neolithic site, 27
Soapstone, use of, 41
Sokolov, B. M., VI
Solutrean period, 24
Somatology of the Kamchadal, 19
Sopochnoye village, 16
Sosnovsky, G. P., 23
finds neolithic grave, 32
Sosva River, neolithic finds, 26

Sotnikoff, Lieutenant, 57
Soza, sent to Russia, 9
Spanberg, Martin, 7, 8
appointed to Bering Expedition, 4
Spassky, G., author, 73
Spear-grass, 45
State Island and Company Land, 8
Stary Ostrog, excavations at, 41
Stchuchya River, neolithic sites on, 26, 35
Stchukino, neolithic site, 27
Steensby, H. P., author, 65
Stefanson, Vilhjamur, on stone lamps, 67
St. Elias Island, 6
Steller, G. W., 5
on cooking, 69
on homage to iron, 64
Sternberg, on clay as food, 66
Stinnikov, A., 9, 11
Stone Age in Siberia, 23
artifacts of, 27
Stone implements, source material for, 41
industry, 29
lamps, 67
St. Lawrence Bay, 7
Island, pottery of, 77
St. Paul, 5, 6
St. Peter, 5, 6
St. Petersburg, Bering returned to, 4
Japanese captives brought to, 7, 10
Sukachev, V. N., on neolithic culture, 35
Suzuki, 75
Syeroglaska village, excavations at, 41
Talko-Hryncewicz, J. D., finds neolithic relics, 28
Tallgren, A. M., on bronze age, 38, 39
Tanaka, N., on earthenware pans, 74
Tarinskaya Bay, 42
Tartary, 8
Temperature of soil, 19
Teploukhov, S. A., 26
Tighil, chief of Kamchadal, 11, 12
climate of, 18, 19
dialect of, 16
excavations at, 41
pits on, 50
River, 1, 2
Titov, A. G., VI
on flint implements, 41
Tlinkit Indians, 69
Tobol River, neolithic finds, 26
Tobolsk Province, neolithic finds, 26
Togo, Admiral, 56
Tokyo, Anthropological Society, 75
Museum of Imperial University in, 75
Tolmachoff, I. P., 7, 15
Tomsk, excavations near, 23
Tong-Hou, 34
iron workers of, 40
Torii, Mrs., on neolithic man, 40
Torii, R., 34
neolithic finds by, 35
on food of Manchuria, 42
on Japanese goods, 37
on Kurilian tradition, 63
on neolithic man, 40
on pottery, 70, 74, 75
on wooden combs, 72
Tovostin, archæologist, 39
Traditions, Kurilian, 63
Transbaikalia, bronze from, 39
Chuds of, 32
neolithic site, 28
Transbaikalia, Steppes, bronze industry of, 38
Transuralian lakes, neolithic finds, 26
Tribute Commissions, 13
Tsuboi, S., 75, 76
Tu-Kiu, iron industry of, 38
Tungus inhabitants of Kamchatka, 16
invaders, 35
tents, 65
Tunguso-Mongolic conquerors, 70
Turkestan, bronze culture of, 39
explorations, 35
Turkish tribes, 70
Turko-Mongolic invaders, 32
Tyan-Shan Mountains, 32
Tynshov, W. N., 68
Tyumen, neolithic dwellings at, 31
Uigurs, 32
Ukamak Island, 6
Ukrainians, immigrants, 57
Ulan-Khad, neolithic dwellings at, 31
neolithic site, 27
Unga River, neolithic site, 27
Ural Mountains, neolithic finds, 26
U. S. National Museum, 77
Usuns, blond, 32
Uvaroff, A. C., neolithic finds, 26
Varkhoyansk range of mountains, 2
Verkhne-Kamchatsk, attacked, 10, 11
fortress founded, 1
Verkholensk Mountain, excavations at, 24
Verneau, France, excavations at, 42
Vitkovsky, N. L., discovers neolithic finds, 27, 31
Vladivostok, 57, 64
immigrants from, 21
Vlasov, V. A., V, 18, 19
Walton, Commander of *Nadezhda*, 7, 8
Washington, U. S. National Museum of, 77
Weber, E. F., 7
West-European archæology, 24
White whales, 17
Witsen, Nicolaas, on clay vessels, 73
Wouhwang, iron workers, 40
Wrangel, Ferdinand von, 7
Wusuns, blond, 32
Yakut huts, 64, 65
Yakutsk, 11
founded, 1
Yana, 2
Yankovsky, M., finds neolithic relics, 28
Yang-Shao culture, 34
Yassak, or fur tribute, 12, 13
Yavino, 57
hot springs, 59
inhabitants of, 19
Yeleneff, A., discovers neolithic finds, 27
Yelovka, 12
River, 11
Yenisei River, neolithic finds, 26, 27
palæolithic sites, 25
Valley, excavations at, 24
Yeniseians, 32
Yeniseisk, neolithic finds, 26
Yershi, neolithic sites, 27
Yezo, 8, 70, 72
Ainos of, 37
iron pots of, 76
clay pan from, 74, 75
Yukaghir, 16
huts, 65

Types of Kamchadal men, women and girls.

A

B

A. Elders of the villages of the western shore of Kamchatka.
B. Group of blind men and women of the village Kharyusovo.

A

B

C

A. Two boats bridged in order to carry author's party across the Avacha River.
B. The same bridged boats carrying the author's cart to a small island and from there across the Avacha River to the village Savoiko. The horses are forced to swim across. The river is not deep and the laborers are punting the boats with long poles.
C. Three bridged boats carrying the author's party and laborers from the mouth of the Tigil River to its tributary, the Kulki River. The laborers are punting the raft along the bank.

A

B

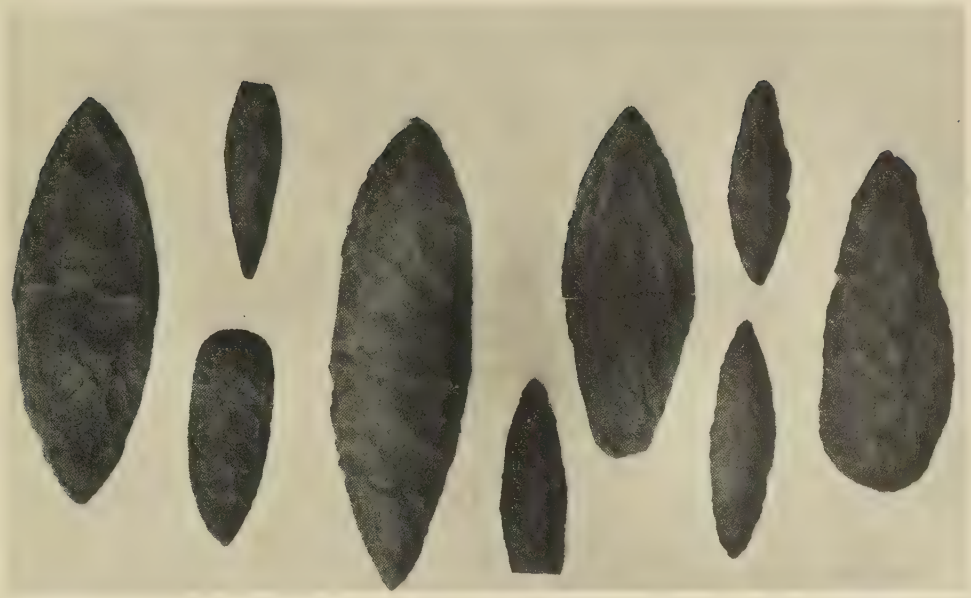
A. A Kamchadal storehouse on posts which serves also as a summer dwelling.
B. Greek-Catholic chapel in the village Kharyusovo.

A

B

C

A. Inner pond on Cape Siwusk in Kuril Lake. In the foreground is the author's camp and the digging of two pits.
(See p. 58.)
B. Unloading the boats, preparatory to ascending the rapids of the Osernaya River.
C. When rapids were encountered, the occupants of the boat disembarked and pulled at the ropes instead of the oars.

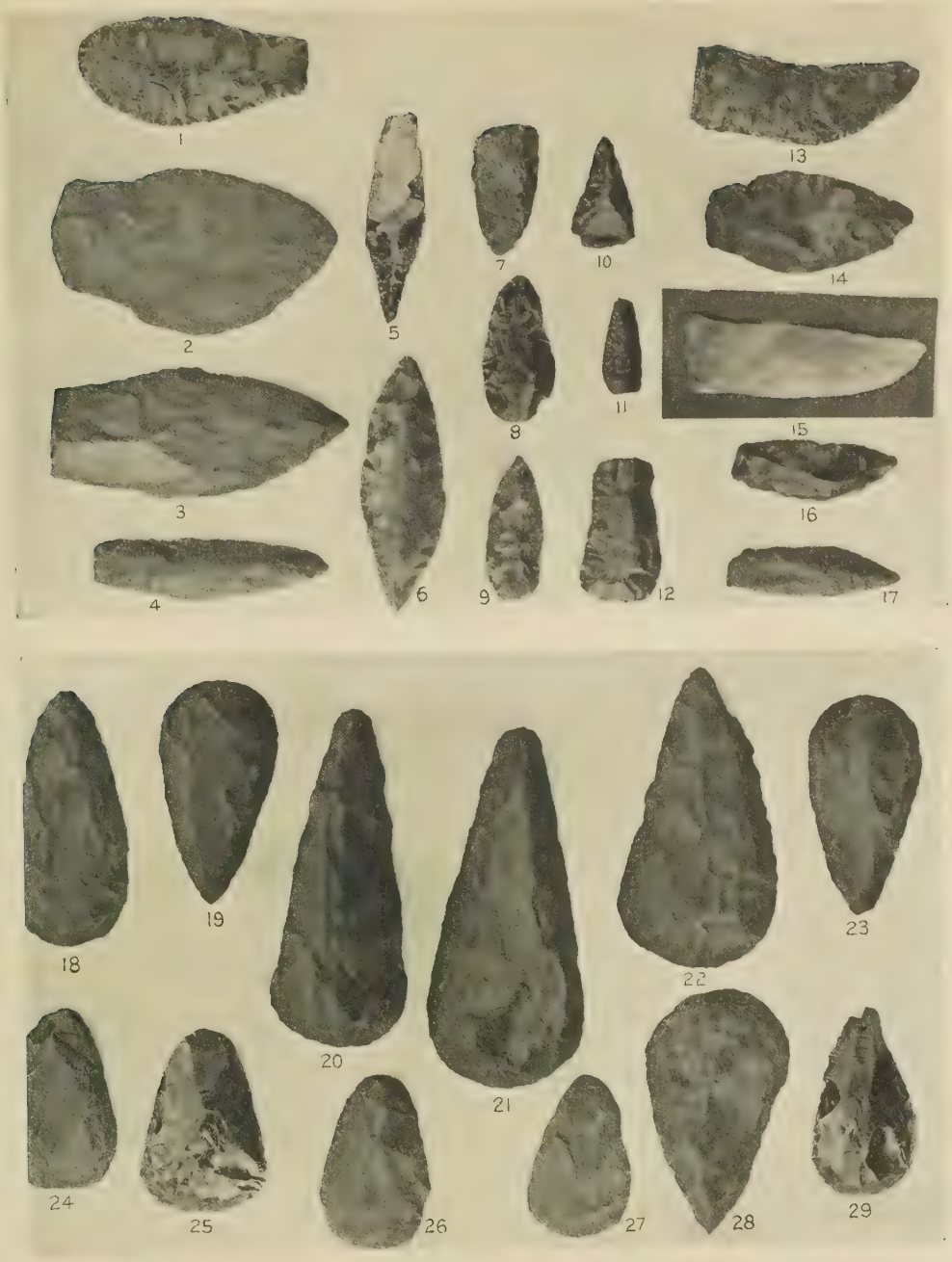


A

B

A. (2959–2967). Lance and arrow heads of quartzite. About one-half natural size; the length of the largest head is 141 mm.

B. (2968–2987). Lance and arrow heads of obsidian. About three-fifths natural size; length of the largest head is 80 mm. and that of the smallest 18 mm.

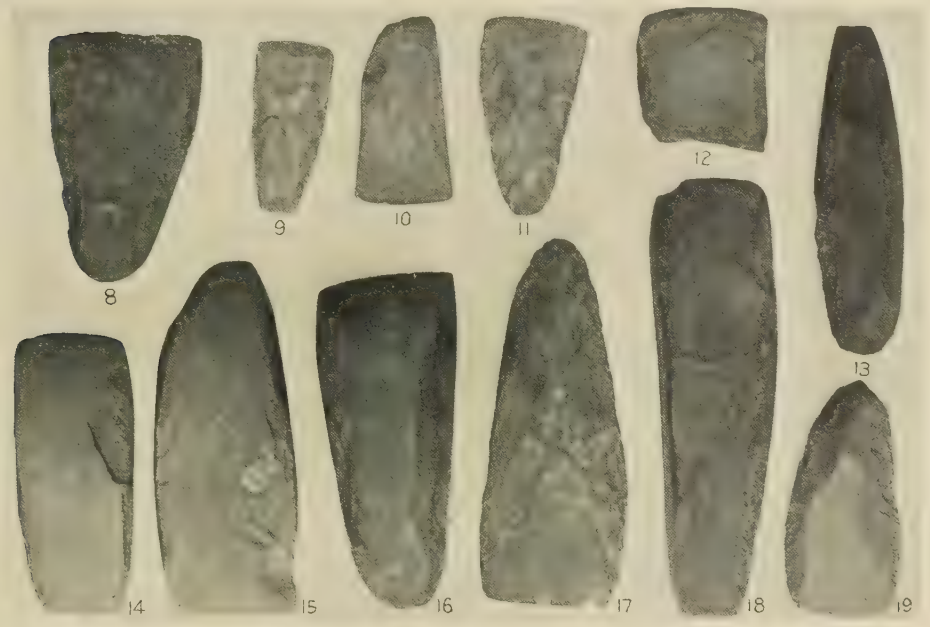


1 (2988). Man's knife of andesite, with wooden handle.
2 (2989). Man's knife of quartzite, with wooden handle.
3 (2990). Lance head of silicified slate.
4 (2991). Arrow head of quartzite.
5 (2992). Drill point of hornstone schist, with wooden or bone handle. Used for drilling wood, bone and also sinkers of volcanic tuff.
6 (2993). Arrow point of quartzite.
7 (2994). Arrow point with straight base, of silicified slate.
8 (2995) and 9 (2996). Arrow point with rounded base, of silicified slate.
10 (2997). Drill point of hornstone schist.
11 (2998). Small arrow point of quartzite, not finished.
12 (2999). Small adze of quartzite.
13 (3000). Curved carving knife of andesite, with handle.
14 (3001). Arrow point of quartzite.
15 (3002). Curved carving knife of light-green quartz schist.
16 (3003). Small carving knife of silicified slate.
17 (3004). Small arrow point of quartzite, unfinished.
18–24 (3005–3011) and 26–28 (3013–3015). Scrapers of quartzite.
25 (3012) and 29 (3016). Scrapers of andesitic obsidian.

All obtained in excavations on Kuril Lake. About three-fifths natural size; largest specimen 93 mm. long.

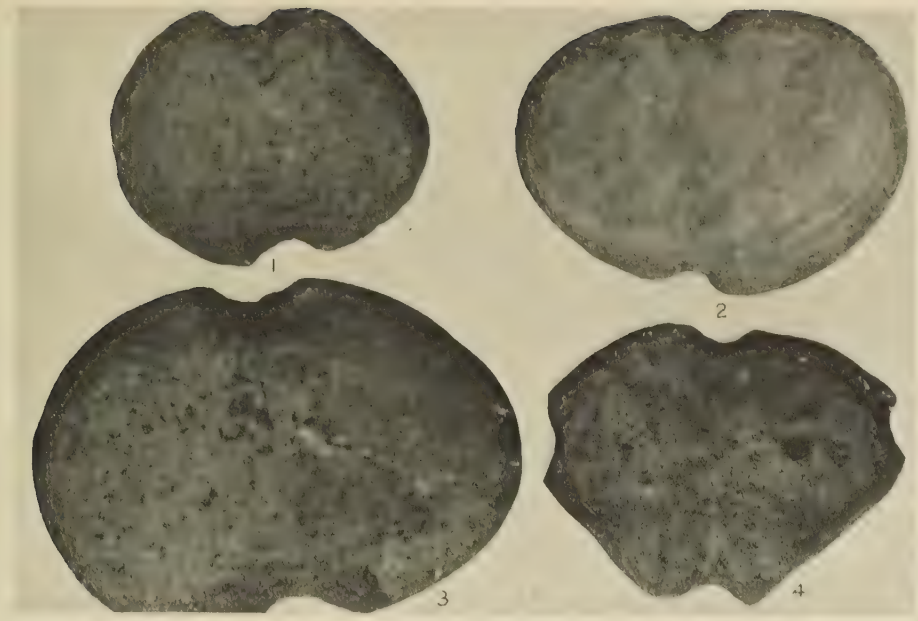
1 (3017). Andesite knife for carving wood, with projection for securing it to wooden or bone handle.
2 (3018). Andesite point of a lance.
3 (3019). Skin scraper of quartz schist.
4 (3020). Skin scraper of quartz schist.
5 (3021). Fragment of an andesite point.
6 (3022). Spear point of quartz slate, unfinished.
7 (3023). Andesite point of a lance.
8 (3024), 9 (3025), 10 (3026). Andesite point of an arrow.
11 (3027). Andesite blade of a lance.
12 (3028). Same as figure 8.
13 (3029), 14 (3030). Andesite blade of a lance.
15 (3031). Skin scraper of silicified slate.
16 (3032). Andesite blade of a lance.
17 (3033), 18 (3034). Andesite blade for an arrow.
19 (3035). Flint blade for a lance.
20 (3036). Arrow point of quartz schist.
21 (3037). Fragment of a quartz schist point.
22 (3038). Flint blade for a lance, unfinished.
23 (3039). Andesite blade for a lance.

All specimens from Kuril Lake.

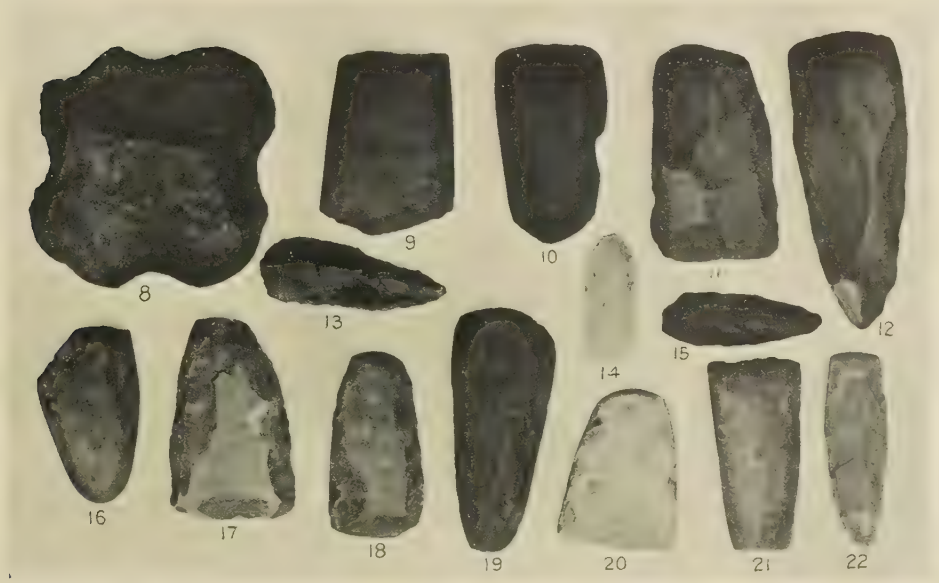


1 (3168). Adze of green quartz schist, polished. From Kuril Lake.
2 (3169). Adze of green quartz schist, blade polished. From Kuril Lake.
3 (3170). Ax of jasper, wholly polished. From Kuril Lake.
4 (3171). Ax of chalcedony (agate), partly polished. From Kuril Lake.
5 (3172). Ax of quartz schist, polished. From Kuril Lake.
6 (3173), 7 (3174). Adze of green quartz schist, polished. From Kuril Lake.
8 (3175). Adze of hornstone schist, not perfectly polished. From Kavran.
9 (3176). Adze of quartz schist. From Kavran.
10 (3177). Adze of jasper, polished. From Kavran.
11 (3178). Adze of quartz schist, polished. From Kavran.
12 (3179). Fragment of an adze of quartz schist. From Kavran.
13 (3180). Chisel of jasper, partly polished. From Kavran.
14 (3181). Adze of agate, polished. From Kavran.
15 (3182). Adze of jasper, polished. From Kavran.
16 (3183). Adze of agate, polished. From Kavran.
17 (3184). Adze of quartz schist, partly polished. From Kavran.
18 (3185). Chisel of jasper, polished. From Kavran.
19 (3186). Adze of green quartz schist. From Kavran.

The largest specimen of this plate, figure 4, is 197 mm. long.

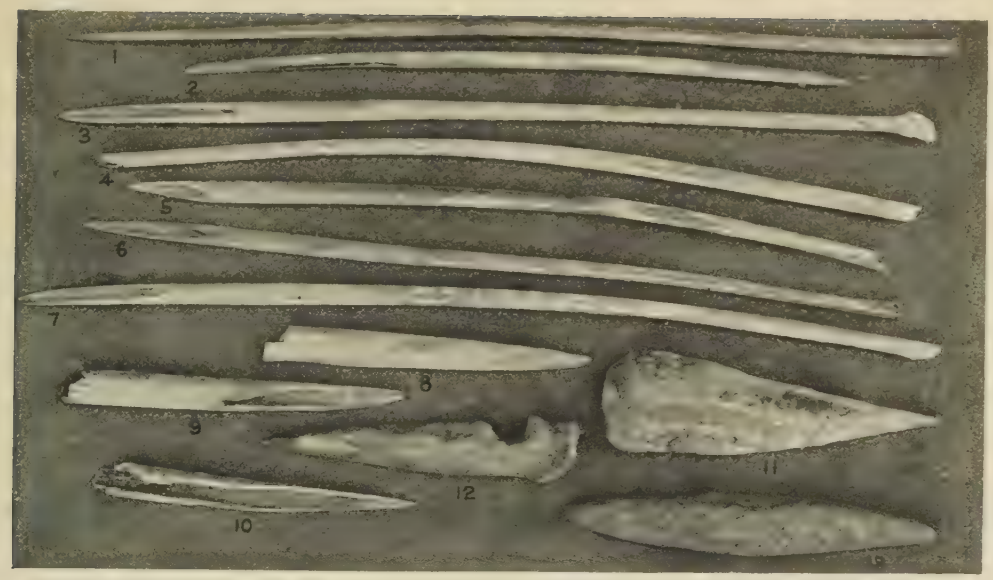


1 (3187). Fish-hook sinker of volcanic andesitic tuff from the mouth of Kavran River.
2 (3188), 3 (3189). Fish-hook sinker of quartz diorite from the mouth of Kavran River.
4 (3190). Fish-hook sinker of diabase porphyrite from the mouth of Kavran River.
5 (3191), 6 (3192). Fish-hook sinker of volcanic andesitic tuff with a drilled hole, from mouth of Kavran River.
7 (3193). Fish-hook sinker of volcanic andesitic tuff grooved all around, from Kuril Lake.
8 (3194). A stone pestle of quartzite for grinding food, from Kuril Lake.



1 (3210). Fish-hook sinker of quartz diorite.
2 (3211). Whetstone of porphyrite for sharpening bone needles.
3 (3212). Whetstone of slate for polishing bone implements.
4 (3213). Whetstone of porphyrite for polishing stone implements.
5 (3214). Whetstone of tachylite tuff.
6 (3215), 7 (3216). Whetstone of slate.
8 (3195). Fish-hook sinker of diabase porphyrite.
9 (3196), 10 (3197). Fragment of an adze of dark-green quartz schist.
11 (3198). Adze of green quartz schist, unfinished.
12 (3199). Adze of jasper, partly polished.
13 (3200). Drill point of hornstone schist.
14 (3201). Small chisel of light-green quartz schist.
15 (3202). Small arrow point of andesitic obsidian.
16 (3203). Fragment of an adze of green quartz schist.
17 (3204), 18 (3205). Adze of green quartz schist, partly polished.
19 (3206). Adze of dark reddish jasper, polished.
20 (3207). Adze of light-green quartz schist.
21 (3208). Fragment of an adze of dark-green quartz schist.
22 (3209). Chisel of quartz schist, only the edge is polished.

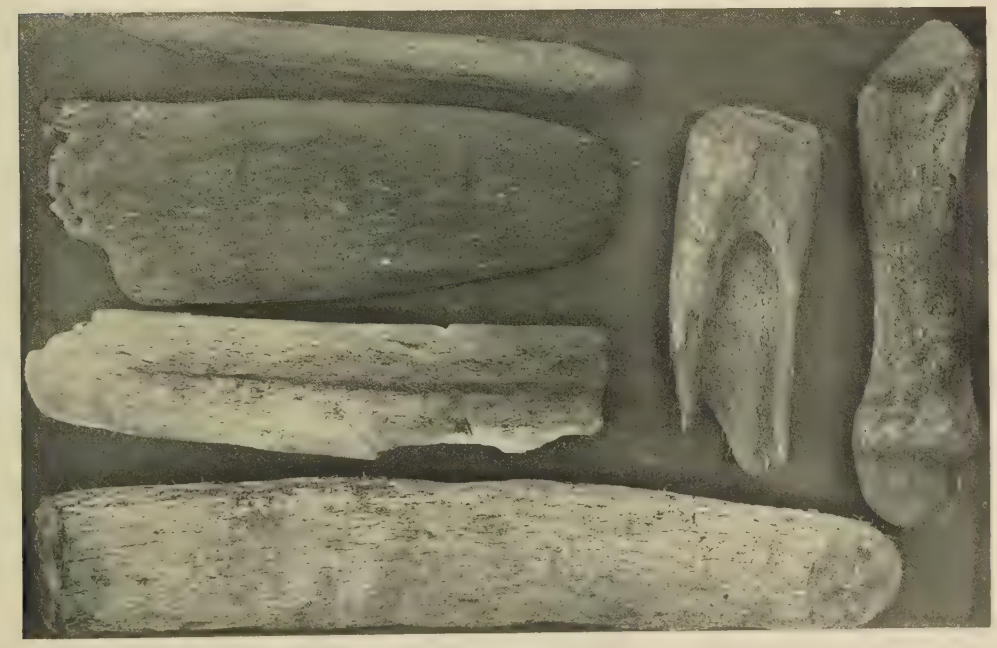
All the specimens of this plate were obtained in excavations on the shores of the Kuril Lake. Two-fifths natural size, the largest specimen is 132 mm. long.



1 to 7 (3090–3096). Bone awls for splitting sinews of reindeer and sea-mammals into threads for sewing. Made of the bones of bird wings, mostly wild geese and swans.
8 to 10 (3097–3099). Bone awls of birds' legbones, used when sewing skins.
11, 12 (3100–3101). Bone awls made of birds' shoulder blades.
13 (3102). Awl made of wing bone of a swan. Both ends may be used when sharpened.
14 to 16 (3103–3105). Bone heads of bow-arrows, partly decayed.
17 to 23 (3106–3112). Bone foreshafts of bow arrows. The stem of the foreshaft entered into a socket of the wooden shaft. A sinew cord was lashed around this joint. The upper end of the foreshaft is bifurcated to receive a stone blade. The stem of the blade was glued to the bifurcation and fastened by a sinew thread, lashed around the foreshaft, on which notches are to be seen for attaching the lashing thread. The bone foreshafts are partly decayed.
24 (3113), 25 (3114). Broken bone point which could be used as a head of an arrow of a bow or as a central prong of a dart for water birds. Figure 24 is in a decayed state.
26 (3115). Represents a head of a harpoon.

All specimens were obtained in excavations on the shores of the Kuril Lake. Three-fifths natural size.

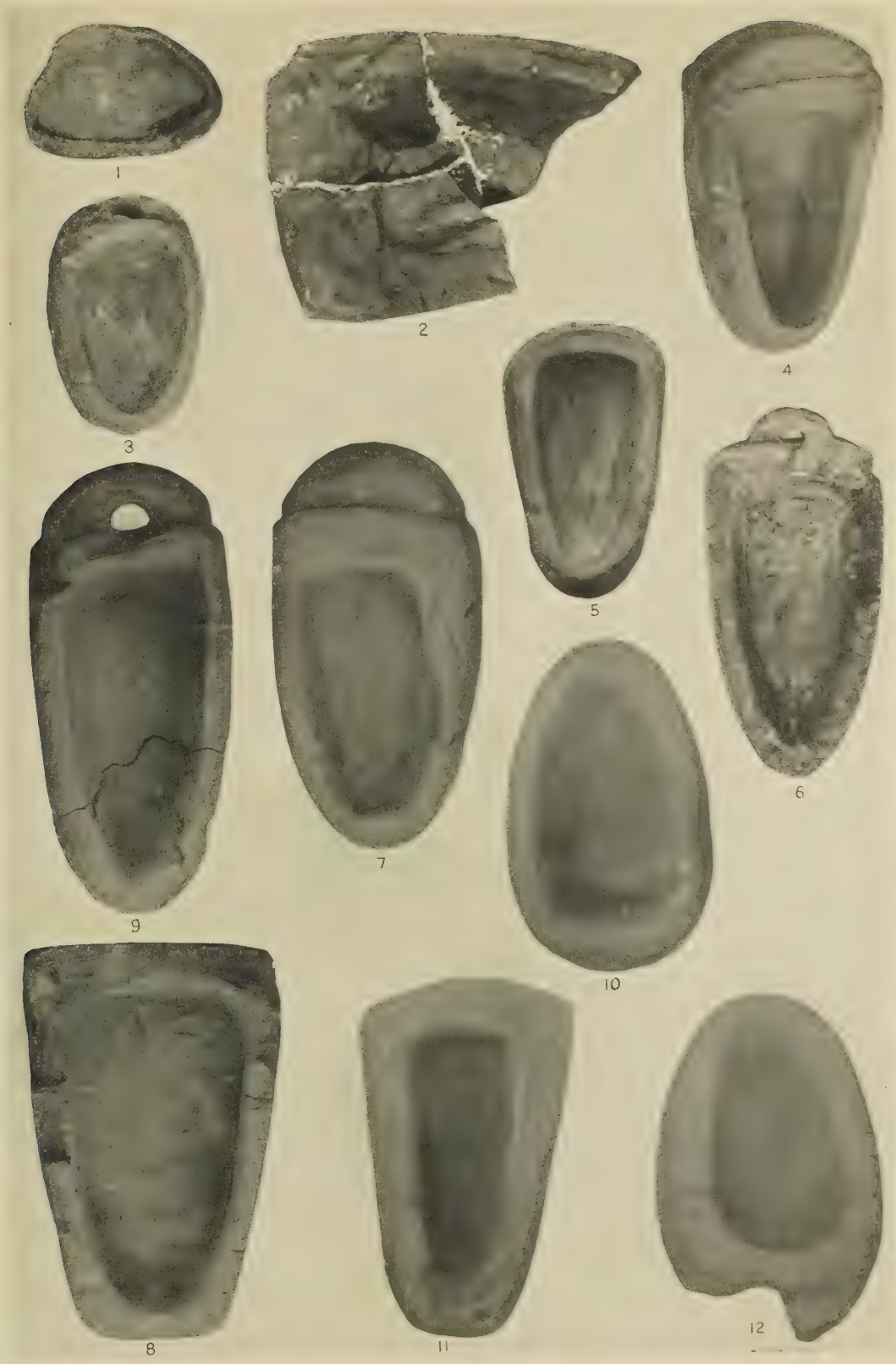
A



B

A. 1 (3124). Bone marline-spike for untying knots.
2 (3125). Similar implement with broken-off ends.
3 (3126). Bone ball with an ear for hanging, possibly as a decoration to woman's dress.
4 (3127). Bone implement for unknown purpose. It may have been used as a thong-dresser, or to attach dogs to a post.
5 (3128). Bone root-digger.
B. (3130-3135). Fragments of decayed bone implements.

All bone implements of this plate were discovered in pits of old dwellings on the shore of Kuril Lake. Three-fifths natural size.

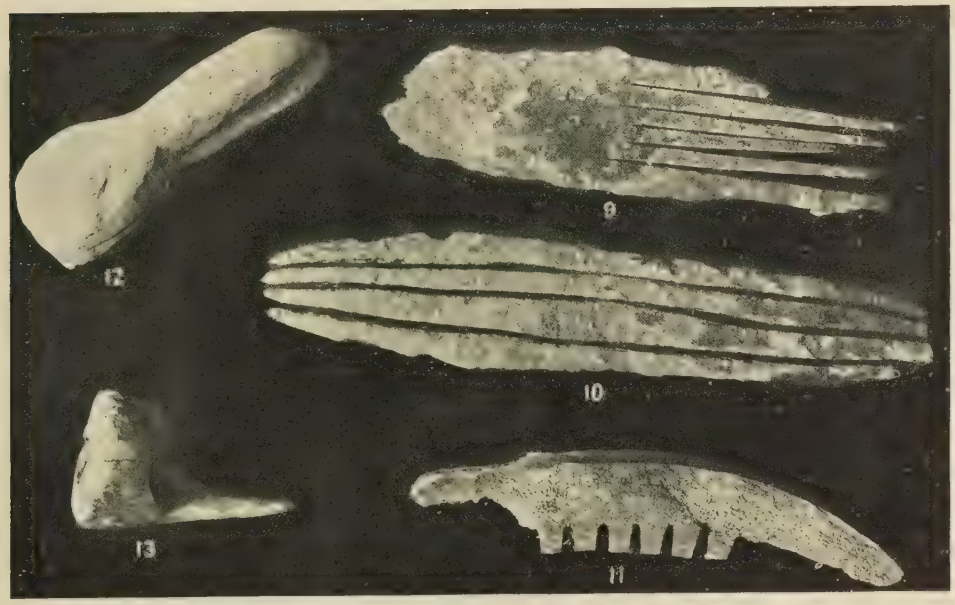


1 (2211). Small lamp of quartz slate. Nalacheva Lake.
2 (3232). Cemented fragments of lamp of diorite. Kuril Lake.
3 (3136). Lamp of quartz slate. From Kuril Lake.
4 (3137). Lamp of quartzite. From Kuril Lake.
5 (3138). Lamp of sandstone. From Kuril Lake.
6 (3139). Lamp of quartz schist. From Kuril Lake.
7 (2921). Lamp of quartz schist. From Kavran site.
8 (2922). Lamp of quartzite. From Kavran.
9 (2923). Lamp of quartz slate. From Kavran.
10 (3143). Lamp of quartz slate. From Kuril Lake.
11 (3144). Lamp of quartzite. From Kuril Lake.
12 (3145). Lamp of quartz schist. From Kuril Lake.

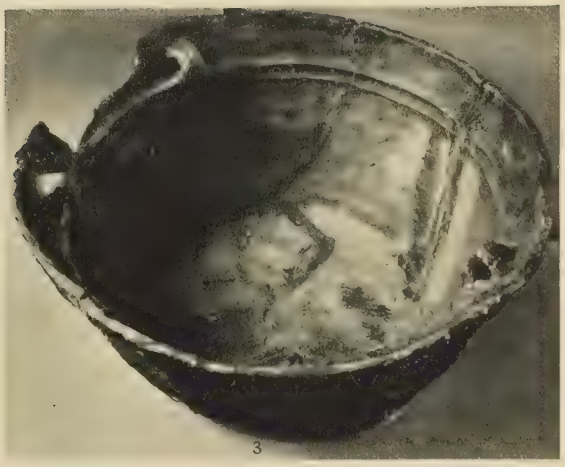
Figures 1, 2 half natural size, figures 3 to 12 two-fifths natural size.

1 (3160). Lamp of andesitic lava.
2 (3161). Lamp of quartz schist.
3 (3162). Lamp of andesitic lava.
4 (3163). Lamp of quartz schist.
5 (3164). Lamp of quartzite.
6 (3165). Lamp of andesitic lava.
7 (3166). Lamp of quartz schist.
8 (3167). Lamp of quartzite.

All specimens from Kuril Lake. About two-fifths natural size.



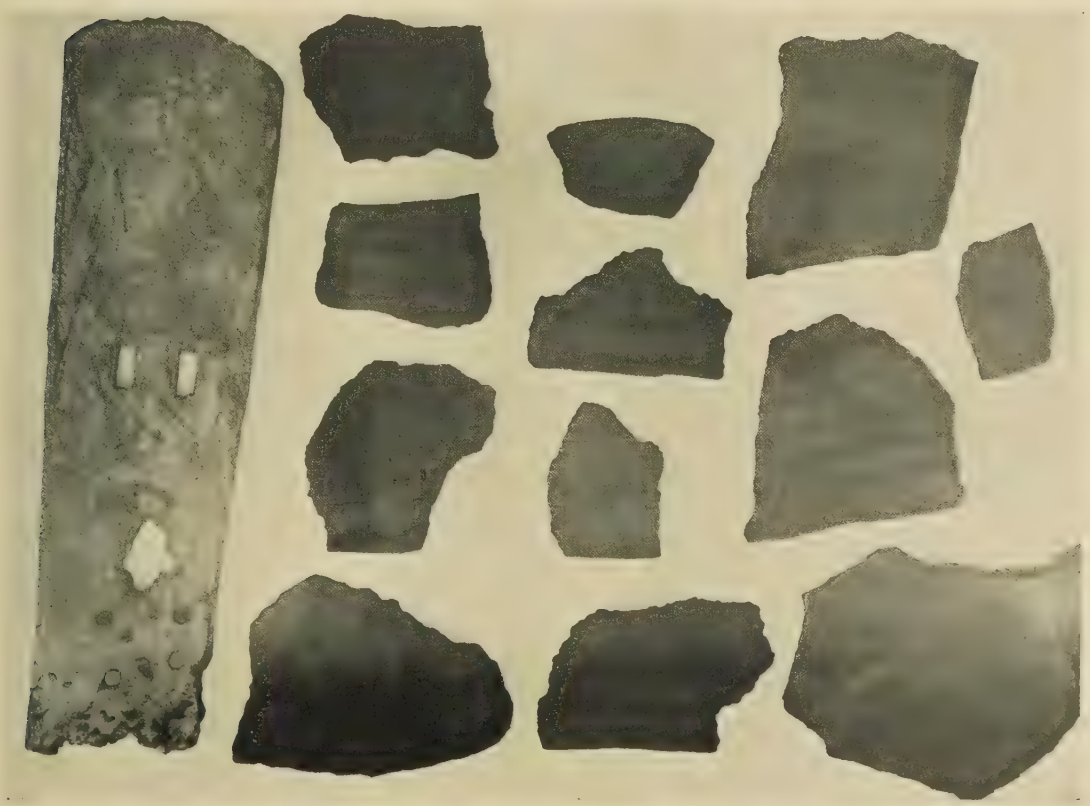
1, 2. Unknown bone implements. May be stamps to decorate clay pots when the clay is still wet.
3. Fragment of harpoon bone head.
4 and 5. Seem to be decayed bone prongs of a bird dart.
6. A perforated seal's tooth, worn as ornament.
7. Bone belt-buckle without decoration.
8. Bone belt-buckle ornamented with engraved zigzags, interwoven curves and circles.
9. Half decayed bone comb.
10. Comb-like bone implement, as it seems to the author, for impressing parallel lines under the rim of clay pots.
11. Bone implement for stamping clay pots, as shown on potsherds on Plates 17 and 18.
12. Bone implement for making fillets under the rim.
13. Bone implement for ornamenting clay pots by puncturing.



1. Clay pot with ears inside; discovered by the author in a pit of an old Kamchadal dwelling on the shore of Nalacheva Lake. The pot was split in two places, but complete, and later cemented by the author. The splitting may be regarded as a result of freezing and thawing of the soil. It was discovered at the depth of 3 feet 4 inches. Digging was done with great care. When a piece of the rim appeared, the spade was discarded and the earth from and around the pot was taken out by the hands. For the dimensions of the pot see p. 48.
2. Similar clay pot of smaller size, discovered in a pit on the Nalacheva Cape.
3. Portion of upper part of a clay pot without handles inside. It consists of three fragments cemented together by the author. No other pieces of the same pot were discovered and we do not know whether its bottom was flat or rounded. Outer parallel lines made by a comb-like implement are similar to inner parallel lines of pots with handles inside.

Fragments of clay pots, some with ears inside. From Nalacheva Cape, Nalacheva Lake, and shores of Kuril Lake.
Some of these fragments have no parallel lines inside.

A



B

A (2704). 18 fragments of pottery discovered in the site of Kulki River.
B (2863–2875). 12 fragments of pottery found in excavations of the banks of Kavran River and a fragment of some bone implement.

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